Über dieses Buch

Dies ist ein digitales Exemplar eines Buches, das seit Generationen in den Regalen der Bibliotheken aufbewahrt wurde, bevor es von Google im Rahmen eines Projekts, mit dem die Bücher dieser Welt online verfügbar gemacht werden sollen, sorgfältig gescannt wurde.

Das Buch hat das Urheberrecht überdauert und kann nun öffentlich zugänglich gemacht werden. Ein öffentlich zugängliches Buch ist ein Buch, das niemals Urheberrechten unterlag oder bei dem die Schutzfrist des Urheberrechts abgelaufen ist. Ob ein Buch öffentlich zugänglich ist, kann von Land zu Land unterschiedlich sein. Öffentlich zugängliche Bücher sind unser Tor zur Vergangenheit und stellen ein geschichtliches, kulturelles und wissenschaftliches Vermögen dar, das häufig nur schwierig zu entdecken ist.

Gebrauchsspuren, Anmerkungen und andere Randbemerkungen, die im Originalband enthalten sind, finden sich auch in dieser Datei – eine Erinnerung an die lange Reise, die das Buch vom Verleger zu einer Bibliothek und weiter zu Ihnen hinter sich gebracht hat.

Nutzungsrichtlinien

Google ist stolz, mit Bibliotheken in partnerschaftlicher Zusammenarbeit öffentlich zugängliches Material zu digitalisieren und einer breiten Masse zugänglich zu machen. Öffentlich zugängliche Bücher gehören der Öffentlichkeit, und wir sind nur ihre Hüter. Nichtsdestotrotz ist diese Arbeit kostspielig. Um diese Ressource weiterhin zur Verfügung stellen zu können, haben wir Schritte unternommen, um den Missbrauch durch kommerzielle Parteien zu verhindern. Dazu gehören technische Einschränkungen für automatisierte Abfragen.

Wir bitten Sie um Einhaltung folgender Richtlinien:

+ *Nutzung der Dateien zu nichtkommerziellen Zwecken* Wir haben Google Buchsuche für Endanwender konzipiert und möchten, dass Sie diese Dateien nur für persönliche, nichtkommerzielle Zwecke verwenden.

+ *Keine automatisierten Abfragen* Senden Sie keine automatisierten Abfragen irgendwelcher Art an das Google-System. Wenn Sie Recherchen über maschinelle Übersetzung, optische Zeichenerkennung oder andere Bereiche durchführen, in denen der Zugang zu Text in großen Mengen nützlich ist, wenden Sie sich bitte an uns. Wir fördern die Nutzung des öffentlich zugänglichen Materials für diese Zwecke und können Ihnen unter Umständen helfen.

+ *Beibehaltung von Google-Markenelementen* Das "Wasserzeichen" von Google, das Sie in jeder Datei finden, ist wichtig zur Information über dieses Projekt und hilft den Anwendern weiteres Material über Google Buchsuche zu finden. Bitte entfernen Sie das Wasserzeichen nicht.

+ *Bewegen Sie sich innerhalb der Legalität* Unabhängig von Ihrem Verwendungszweck müssen Sie sich Ihrer Verantwortung bewusst sein, sicherzustellen, dass Ihre Nutzung legal ist. Gehen Sie nicht davon aus, dass ein Buch, das nach unserem Dafürhalten für Nutzer in den USA öffentlich zugänglich ist, auch für Nutzer in anderen Ländern öffentlich zugänglich ist. Ob ein Buch noch dem Urheberrecht unterliegt, ist von Land zu Land verschieden. Wir können keine Beratung leisten, ob eine bestimmte Nutzung eines bestimmten Buches gesetzlich zulässig ist. Gehen Sie nicht davon aus, dass das Erscheinen eines Buchs in Google Buchsuche bedeutet, dass es in jeder Form und überall auf der Welt verwendet werden kann. Eine Urheberrechtsverletzung kann schwerwiegende Folgen haben.

Über Google Buchsuche

Das Ziel von Google besteht darin, die weltweiten Informationen zu organisieren und allgemein nutzbar und zugänglich zu machen. Google Buchsuche hilft Lesern dabei, die Bücher dieser Welt zu entdecken, und unterstützt Autoren und Verleger dabei, neue Zielgruppen zu erreichen. Den gesamten Buchtext können Sie im Internet unter `http://books.google.com` durchsuchen.

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google books

https://books.google.com

Stanford University Libraries
3 6105 125 356 423

WAY
ILWAY
LD

Digitized by Google

LELAND·STANFORD·JVNIOR·VNIVERSITY

Digitized by Google

Digitized by Google

Digitized by Google

STANFORD LIBRARY

THE

Tramway & Railway World

Vol. XXXIX. No. 1.] LONDON, SATURDAY, JANUARY 1, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large Illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

TO STEEL CONSTRUCTIONAL CONTRACTORS.

ST. PANCRAS BOROUGH COUNCIL.

ELECTRICITY DEPARTMENT.

EXTENSION OF POWER HOUSE.

Tenders are invited for Steel Constructional Work.

Drawings may be inspected at 57, Pratt Street, Camden Town, N.W., on and after the 20th inst. Specifications may be had on payment of £1. Tenders must be submitted to the undersigned, endorsed "Tender for Steelwork," by noon on Monday, January 10, 1916.

The Council do not bind themselves to accept the lowest or any Tender.

C. H. F. BARRETT,
Town Clerk.

Town Hall, Pancras Road, N.W.,
December 14, 1915.

COUNTY BOROUGH OF DARLINGTON.

MECHANICAL COAL HANDLING PLANT.

The Darlington Corporation is prepared to receive tenders for the supply and erection of Coal Bunkers, Elevators, etc., at their Electricity Works.

Copies of the specification and conditions may be obtained on application to the Borough Electrical Engineer, Electricity Works, Haughton Road, Darlington, accompanied by a deposit of one guinea, which will be returned on receipt of a bona fide tender.

Sealed tenders, endorsed "Tenders for Coal Handling Plant," to be delivered to the undersigned not later than January 12, 1916.

H. G. STEAVENSON,
Town Clerk.

Town Clerk's Office, Darlington,
December 14, 1915.

BEXLEY URBAN DISTRICT COUNCIL.

SUPPLY OF TAR, HIGHWAY MATERIALS, PIPES AND STORES.

The Bexley Urban District Council invite tenders for the supply of Tar, Highway Materials, Best Glazed Stoneware Socketted Pipes and Best Portland Cement for the year ending March 31, 1917.

Specifications and Form of Tender can be obtained upon application to Mr. W. T. HOWSE, Surveyor to the Council.

Sealed tenders, endorsed "Tender for ——," must be sent to the undersigned (upon the prescribed form) not later than 10 a.m. on Tuesday, January 11, 1916.

The lowest or any tender will not necessarily be accepted.

THOS. G. BAYNES,
Clerk to the Council.

Council Offices, Bexleyheath,
December 16, 1915.

TO ENGINEERS.

The Gosport and Alverstoke Urban District Council invite tenders for the supply of a New Flywheel, Crankshaft, Steam and Air Eccentrics, Spindles, etc., for existing Steam Engine Air Compressor.

Specification can be seen and Form of Tender obtained on application to the Engineer and Surveyor to the Council, Town Hall, Gosport.

Tenders addressed to the Clerk to the Council, sealed and endorsed "Tender for New Flywheel, etc." to be delivered at the Council Offices at or before 10 a.m., January 4, 1916.

POSITIONS VACANT.

BOROUGH OF LANCASTER.

Applications are invited immediately for the position of Switchboard Attendant.

Salary 30s. per week.

Preference will be given to a man with technical training and works practice.

Applications, stating age, training, experience and when at liberty, to be received by the undersigned not later than WEDNESDAY MORNING, JANUARY 5, 1916.

War service badge provided.

J. B. PATTERSON,
Acting Borough Electrical and Tramways Engineer.

Electricity Works, Lancaster.
December 17, 1915.

SWITCHBOARD ATTENDANTS.

CORPORATION OF WAKEFIELD ELECTRICITY DEPARTMENT.

Wanted, two Switchboard Attendants at the Wakefield Corporation Electricity Works. Applicants must already have some experience of the working of a large A.C. switchboard. State salary required. The person engaged will be "on War Service," but no applications are desired from those so engaged at present without the full consent of their employers. Written applications, enclosing copies of testimonials, to be addressed to the CITY ELECTRICAL ENGINEER, Wakefield.

SHIFT ENGINEER.

Borough of Eccles.—The Electricity Committee requires a Shift Engineer (for permanent engagement) in their generating station, wages 40s. per week, rising to 42s. per week at the expiration of six months' approved service; war service badge provided.—Applications endorsed "Shift Engineer," stating age, experience, and when able to commence duty, accompanied by copies of not more than three recent testimonials, to be addressed to the BOROUGH ELECTRICAL ENGINEER, Electricity Works, Cawdor Street, Patricroft, Lancs., and forwarded so as to arrive not later than Wednesday, the 5th inst.

CIVIL ENGINEER.

Required immediately for important Railway in North China, Civil Engineer with good railway experience. Three years agreement. Salary £350, £400, £450 per year respectively. First-class fare out and home; free unfurnished quarters. Necessary passports will be arranged.—Applications to be made by letter only, stating age, full particulars of experience and copies of testimonials, and whether single or married, to X.Y.Z., care of J. W. Vickers and Co., Ltd., 5, Nicholas Lane, London, E.C.

SUB-STATION ATTENDANTS.

Sub-station Attendants of over military age, or who are otherwise ineligible for Naval or Military service, wanted temporarily to take the place of men serving with the Forces. Wages £2 per week of 56 hours; overtime at single rates, and in addition 3s. per week war bonus.—Apply, with particulars of past experience, to GENERAL MANAGER, Electricity Offices, Dunning Street, Sunderland.

ARMATURE WINDER.

Armature Winder wanted immediately for re-winding Traction Motors; long hours and high wages for a good man.—Manager, Corporation Tramways, Brighton.

OVERHEAD LINESMAN.

Leading Linesman required at once. Permanent position to suitable man. State age and experience. Wages 45s. per week and 2s. war bonus.—Tramways Manager, Birkenhead.

263022

Digitized by Google

STANFORD LIBRARY

Now Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

MEMBER INSTITUTION OF MECHANICAL ENGINEERS;
MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND;
MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS;
MEMBER MUNICIPAL TRAMWAYS ASSOCIATION;
FELLOW PERMANENT WAY INSTITUTION.

SOME PRESS OPINIONS:

"The author of this book has produced an excellent book of reference."—*The Engineering Review.*

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

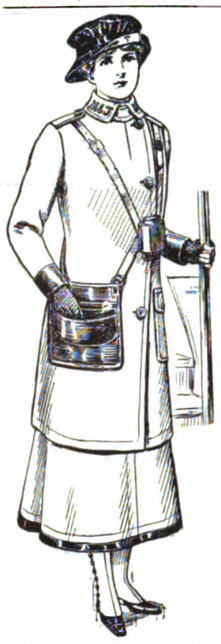
Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Garrould's

TO H.M. WAR OFFICE, H.M. COLONIAL OFFICE, INDIA OFFICE, ST. JOHN AMBULANCE ASSOCIATION, BRITISH RED CROSS SOCIETY, LONDON COUNTY COUNCIL, GUY'S HOSPITAL, &c.



SPECIAL DESIGNS
FOR
WOMEN TRAMWAY CONDUCTORS & DRIVERS
ALSO
Railway Ticket Inspectors.

Complete Costume of Blue Cloth. The Coat lined with wool, with Gilt Initials upon the collar. . .
Coat, Collar, Cuffs, and Skirt are bound with leather. . . . . .

2 Guineas each.

Special Reduction for Quantities of 100 and over. Sample Garment sent - - - for inspection. - - -

***A LARGE ORDER** for Coats and Skirts has just been completed for*
The Great Western Railway Co.,
London and North-Western Railway Co.,
The Metropolitan Tramways, Ltd.,
&c., &c.

CONTRACTORS to UNIONS, ASYLUMS
FOR
LINENS, PRINTS, WARD DRESSES, &c., &c.

E. & R. GARROULD,
150 to 162, EDGWARE ROAD, LONDON, W.
Telegrams: "Garrould, London."
Telephones: 5320, 5321, 6297 Paddington.

Whenever you are repainting your poles ask for samples of the Kearslev ready-mixed POLE PAINTS as supplied to important Companies at home and abroad. These Paints are durable, retain their colour during exposure, and prevent rust. Information free on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.

Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controllers, Leeds."
Telephone: 3488 Leeds.

OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

Digitized by Google

THE
Tramway AND Railway World
Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JANUARY 1, 1916.

WOMEN CONDUCTORS AND THE POLICE.

One aspect of a prosecution of a motorman and a woman conductor of the Carlisle Tramways Company is deserving of the attention of managers generally. The police allegation was that a car was overcrowded, and the inspector of stage carriages, at whose instance the summons had been issued, praised the work of the women conductors but stated that they would not appeal to the police. Nothing seems to have been said as to the directions in which the conductors, who in this case are girls, are invited to ask for the aid of the police, but it is no doubt in such matters as passengers riding on the platform or refusing to leave the car when full. Viewed in its concrete aspect this failing on the part of the conductors constitutes a testimony to the sense of duty entertained by them. It may also indicate a desire to stand well in the estimation of the public. On the other side of the scale the suggestion might be made that such a spirit of independence does not speak well for the manner in which the police are regarded by young persons who ought to look upon them as their protectors, especially when police and conductors are alike public servants. Judging by the observations of the Carlisle officer the police there are anxious to afford assistance to the conductors, and when every aspect of the matter is taken into consideration it is certainly to the interest of a tramway undertaking that its servants should be instructed not to hesitate to avail themselves of their services. The wording of the summonses in the Carlisle case suggests that there is a course open to the company by which it can secure legal sanction to carrying a certain number of excess passengers. The motorman and conductor were summoned for allowing a greater number of people to travel on a car than there was sitting accommodation for, and also for permitting certain passengers to travel on the steps and both platforms. The car was licensed to carry 48 persons, but the police alleged that there were 82 passengers. There was a conflict of evidence as to the latter number and also as to whether the night was a wet one. One witness for the defence stated that the open-top deck did not contain more than five persons. The main point of the company's defence was that the bye-law did not specify where the 48 persons were to be conveyed—how many inside or how many on top. A very fair view of the matter was taken by the magistrates, who, while dismissing the summons, requested the company to take it as a warning to be more strict. An immediate outcome of the case ought to be an application to the Board of Trade for permission to carry excess passengers inside. This concession was obtained even in London for certain occasions a considerable time before the war, and such a course is now permitted at all hours. No objection is taken to it by passengers, who recognise that the times are without precedent, and that with a reduced number of vehicles running people cannot expect a continuance of the pampered condition of ease in which they were accustomed to ride. The conveyance of excess passengers in the lower saloon in provincial towns is so universal that it is surprising to find Liverpool still without such an aid to the conduct of traffic. A city councillor has appealed to the Tramway Committee to allow double the number of passengers on each car so as to make up for the limitations of the service. While it is not possible to consider such an extreme suggestion, there is no reason why passengers should not be allowed to stand on the lower deck. In fact, this practice has become necessary, and it is on the whole an advantage to the public in these days of restricted services.

INCREASED FARES.

Increased fares on the tramways of Douglas Corporation came into force on December 20. On the up journey of the cable section the increase is from one penny to twopence, but on the down journey the penny fare is retained. On the horse section the charge is twopence either way.

East Ham Corporation have received a deputation from the local Trades Council, raising an objection to the increased fares on the cars running from the Albert Dock to Wanstead. A petition, signed by 1,187 persons, was handed in. The spokesman contended that even from the point of view of the big landlords, the alteration of the halfpenny stages was not a good thing. Anything which added to the attractiveness of a town tended to make a bigger demand for houses, and the landlords had been able to get back any increases of the rates in the rents. Various statements had been made as to what the tramways cost the ratepayers, but he could not find anyone who would say it was more than a halfpenny rate. The Mayor promised that the Council would consider the representations.

Edinburgh Tramways Company directors have refused to receive a deputation of the Trades Council in opposition to the increases in the fares of workmen recently made with the approval of the Corporation in order to meet the increased expenses. The manager had asked the Trades Council to forward their views in writing. At a meeting of the latter body on December 21 it was decided to write to the Secretary for Scotland, the Town Council, and again to the Tramway Company on the question of the refusal to receive the deputation. If satisfaction is not obtained in the matter from the Tramway Company the meeting resolved to adopt a recommendation of the executive committee to boycott the cars.

Dewsbury Trades and Labour Council have asked the Tramways Committees of Dewsbury and Batley Corporations to do their utmost to get the 1½*d.* fare from Dewsbury to Hick Lane, Batley, reduced to the old rate of 1*d.* It is stated that Dewsbury Corporation have also made a representation to the Tramways Company.

By 14 votes to 10, Walthamstow Council on December 22 rejected a motion by Councillor Lyne, chairman of the Finance Committee, to abolish the halfpenny fares on the tramways. The Council accepted a recommendation by the Tramways Committee for shortening all stages. Councillor W. R. Clarke, chairman of the Tramways Committee, urged that halfpenny stages should be abolished and the present penny stages maintained. Then he thought the system would be self-supporting. Within the next two or three years there would be a large expenditure for replacing cars and track. Councillor Lyne mentioned that during the ten years the tramways had been opened there had been demands to the extent of £22,700 to meet deficits. The shortage at present was about £6,000 per annum. The only way in which the liabilities could be met was by making the users pay an equitable sum for their ride.

CARRIAGE OF MAIL BAGS.—The Brighton Postmaster saved considerable expense and labour during the Christmas season by utilising the tramcars for the conveyance of mail-bags, at the charge of one penny a bag, from the central railway station to the Aquarium.

Digitized by Google

THE CHRISTMAS HOLIDAY.

At Birmingham and Bradford tramway traffic was suspended on Christmas Day, and on the following day (Sunday) a holiday was given to the tramways employees of Sheffield and Rotherham Corporations, together with the men and women employed by Mexborough and Swinton Tramways Company. The suspension of traffic on the three latter undertakings was arranged in concert. A misunderstanding on the question of pay having arisen at Sheffield, Mr. A. R. Fearnley, the general manager, issued a notification that all who had a holiday would receive a day's pay, and the few who had to work on December 26th would be paid double wages.

Although the Sheffield services were suspended last Sunday, the receipts for Christmas Eve, Christmas Day, and Monday were £4,466, as against £4,149 for the same days last year. The newspapers agree that people attending church, and others, took kindly to the compulsory walk.

Birmingham also records an increase in tramway receipts, despite the holiday on Christmas Day. On the Friday, Sunday, and Monday there were 1,395,000 passengers, an increase of 256,000 over the corresponding period of 1914, while the receipts were £7,010, an addition of £1,267. Very heavy was the Christmas Eve traffic, and every available employee remained longer at work, while many more cars were available. When running was resumed on Sunday the traffic was much heavier than usual for some hours, indicating that people who had spent Christmas with their friends had stayed the night. There was an increase of 58,000 passengers this day, while on Monday the increase numbered 28,000. On several lines traffic was delayed by the gale blowing down trees and hoardings on to the rails.

On Christmas and the two following days, there was a very heavy traffic on the London tramways and omnibuses, but after four o'clock on the first mentioned day the services were greatly curtailed, thus enabling many of the men to leave work at an earlier hour.

Although the recommendation was opposed by several members of the Tramways Committee, the Oldham Council agreed to the entire suspension of the car service on Christmas Day.

THE EMPLOYMENT OF WOMEN.

Partly owing to the present and prospective demand for female labour on war work the Leeds Tramways Committee were one of the last to employ women as car conductors. The uncertainty of retaining the services of the motormen who have passed into the Army Reserve under Lord Derby's scheme has led Mr. J. B. Hamilton, the general manager, to make an experiment in the use of women as car drivers. A number of robust young women are being put through a course of instruction, so that a report can be made to the Committee as to the prospect of filling vacancies from that source of supply. Another suggestion for easing the work of the employees is to stop running the cars at 10 p.m., but that course would not make good any considerable shortage in the number of motormen. Whether or not the attested men are called up depends upon the view taken of their work by the Ministry of Munitions. It is hoped that as the cars carry a great many munition workers the motormen will be considered indispensable to the production of munitions.

Glasgow Tramways Committee have recommended the Council to approve of an extended test of women as drivers by provisionally increasing the number from five to thirty. The Committee also reported that the number of female conductors now exceeds one thousand.

Apropos of the training of three women as car drivers at Cardiff, a local writer mentions the remark of an old motorman that it is a nerve-racking experience to narrowly escape running somebody down.

Success seems to have attended the introduction of female conductors on the London single-deck subway cars and the small double-deck, open-top trail cars on the Embankment-Tooting route. The women are attired in grey uniform and waterproof hats, and they discharge their duty with courtesy and promptitude.

Of the women conductors who have been working on the Leeds cars since the beginning of November, the "Yorkshire Observer" remarks that they are doing admirable work, and are setting the men a new standard of courtesy and attention.

The decision of Bradford Corporation to employ women conductors was arrived at none too soon. At the middle of December 689 of the employees had joined the army, and of the 818 of military age remaining 550 have been attested for the Army Reserve.

More than 600 women are at work on the Birmingham Corporation cars, the total exceeding the number employed on any tramway except the Glasgow Corporation undertaking.

Five women were experimentally introduced as conductors at Northampton on December 20.

One hundred women, or about a sixth of the conductors at Liverpool, are now at work on the tramcars.

Mr. G. W. Holford, general manager at Salford, has reported to the Tramways Committee that the 150 women conductors are working in a most satisfactory manner. The percentage of sickness among them was less than that of the men.

Aberdare Council have authorised the tramways manager to appoint twelve female conductors at the same rate of wages as for men. Half wages will be paid during tuition.

The number of female conductors at Southport has been increased.

Females are now employed as conductors on several routes of the South Lancashire Tramways Company.

CHARGING OF BATTERY VEHICLES.

ESSENTIAL POINTS OF PLUG AND SOCKET STANDARDISED.

The great importance to the electrical and motor vehicle industry of standardising the charging plug and socket used in connection with vehicles propelled by secondary batteries was brought to the notice of the Engineering Standards Committee by the Electrical Vehicle Committee of the Incorporated Municipal Electrical Association in March, 1914. In October of the same year certain proposals for the standardisation of a particular plug and socket, which the latter Committee had drawn up and based on the recommendations of the Electrical Vehicle Association of America, were considered in detail. In order, however, not to depart from their guiding principle of interfering as little as possible with invention and progress, the Sub-Committee, after careful consideration, decided not to suggest, as standard, any detailed design, but to confine their attention to standardising only the essential points necessary to secure interchangeability between any charging plug and any socket of the type selected by the Electric Vehicle Committee (viz., concentric), leaving to them the issue of a detailed specification for the construction of the exact design of plug which, in their opinion, is best suited to the present needs of the industry.

In issuing the standard specification the Sub-Committee express their indebtedness to the Electric Vehicle Committee for their cordial co-operation in the matter, and it is mentioned that the Sub-Committee were assisted in the preparation of the specification by Mr. Frank Ayton, Hon. Sec. of the Electric Vehicle Committee.

The Sub-Committee have also issued the British standard specification for wall plugs and sockets (five Empire two-pin, without earthing connection), for pressures not exceeding 250 volts. In consultation with the manufacturers the dimensions necessary to obtain interchangeability have been agreed upon, the actual design of the plug being interfered with as little as possible. It is of interest to note that the standard plug is required to have side entry for the flexible wire and a suitable hand shield.

The Reports, the prices of which are 5s. 3d. and 5s. 4d. post free respectively, may be obtained direct from the offices of the Committee, 28, Victoria Street, Westminster, S.W., and are published for the Committee by Messrs. Crosby, Lockwood & Son, 7, Stationers Hall Court, E.C.

LEEDS TRAMWAYS OFFICES.

By the opening on December 28 of a portion of the new premises erected for the Tramways and Highways Departments of Leeds Corporation, the tramways undertaking of the city is now able to carry on its work free from the restriction of inadequate space imposed by the old premises in City Square. The new buildings are situated at the junction of Sovereign Street and Lower Briggate, and adjoin the central depôt. There are four storeys, each connected by separate lifts for passengers and goods. A considerable portion of the basement and the ground floor has been allotted to the traffic department, and a rear entrance has been provided to the office at which tickets are issued to the conductors and their cash is received. On the first floor are the offices of the general manager, Mr. J. B. Hamilton, and the Committee rooms for the Tramways and Highways Departments. The accountant's offices and the drawing office are on the second floor, while the top floor is devoted to rooms containing the ticket receptacles. When completed, about the end of February next, the new premises will have cost about £30,000. Since the Corporation took over the undertaking in 1894, nearly £1,000,000 has been earned for the relief of the rates, after paying all charges, *i.e.* sinking fund and interest, permanent way renewals, repair of cars, and increased working expenses, including higher wages to employees. For twelve years past the surplus profit has averaged over £60,000 per annum. More than two hundred cars are in use daily on over thirty routes, the average daily mileage of a car being 113 miles. The total capital expenditure has been £1,678,844. Loans repaid and the sinking fund total £590,421. Electric traction was inaugurated in August, 1897.

ANNUAL INSPECTION OF COMMERCIAL MOTORS.

The tenth annual inspection of commerical motors will take place in London during the month of May, 1916; but the parade of vehicles will not be held this year, owing to the difficulty of sparing vehicles from service during the present period of stress.

The inspection was organised by the Commercial Motor Users' Association with the object of encouraging drivers, by means of money prizes and other awards to take a personal interest in the driving and condition of their vehicles, and to run them without accident. Prizes will be awarded to drivers for results obtained in written and oral examinations, coupled with inspection of their vehicles under running conditions. In this way, it is hoped to carry on the educational work among drivers, which has been one of the aims of the Association since its formation in 1903. The inspecting engineer will visit each garage before the examinations, and his reports on these visits, together with the marks obtained by each driver in the examinations will be recorded by the Committee, and the following awards based thereon:—

CHAMPIONSHIP PRIZES.—(Written Examination.)—Prizes of £5, £3, £2, and ten of £1 each: together with badges and certificates in each section—petrol, steam, and electric drivers.

GENERAL PRIZES.—(Oral Examination.)—Prizes amounting to about £50 in total value, sub-divided into cash prizes of £2, £1, and 10s. each.

Full particulars, and entry forms may be obtained from Mr. F. G. Bristow, Secretary, Commercial Motor Users' Association, 83, Pall Mall, London, S.W.

Digitized by Google

ERITH COUNCIL TO RUN OMNIBUSES.

Application has been made by Erith Urban Council to the Board of Trade for a Provisional Order to amend their Tramways Act to enable them to run motor omnibuses inside and outside of the Council's district. An intimation that no objection will be raised by the Board of Trade has been received, and as Woolwich Council and other local authorities are favourable to the innovation the tramways department will be able to institute a service as soon as the vehicles can be obtained. Additional means of conveyance are greatly needed in this north-eastern district of Kent, which is mainly an industrial locality, where war work is in progress. One large firm have for some time been running motor vehicles of their own in order to convey the employees to and from their work. The Erith Council's tramcars run up to the London County Council's system at Abbey Wood, and south of Erith there is the Bexley Urban Council's tramway undertaking. No other local authority in the London district has obtained authority to run omnibuses, but the matter has been under discussion at Croydon where omnibus competition with the tramways is very keen.

MISCELLANEOUS NEWS AND NOTES.

Restricted Service at Rochdale.—On the recommendation of the general manager, the Tramways Committee have agreed to curtail the car service every evening except on Saturdays and Sundays.

Motor Van for Parcels.—Walsall Tramways Committee have been authorised to purchase a British-made motor van for the parcels traffic.

Conductors and Flash Lamps.—In reply to an enquiry from the general manager of Walthamstow Tramways, the Commissioner of Police has stated that it would not be advisable to provide electric flash lamps for the use of conductors.

Brighton Charge for Traction Power.—The Electricity Committee of Brighton Corporation have advanced the charge made for power to the tramways department from 1.35*d.* per unit to 1.4*d.*

Delay in Delivery of Material.—The services of the Mexborough and Swinton Tramways Company have undergone some dislocation owing to labour shortage and the delay in delivery of material and new cars.

New Plant for Chesterfield.—The Electricity Committee have recommended the installation of a 400 kw. direct-current alternator, and the equipment of four more boilers with coke breeze burning apparatus. The cost of the latter work is estimated at £219.

An Installation of Diesel Engines.—The power-house of the Colombo Electric Tramways and Lighting Company now contains seven Diesel engines, viz., two of 225 horse-power, two of 400, one of 525, and two of 500 horse-power. The last two have been recently installed.

Sanction for a Crossover.—Hastings Council have granted permission to the Tramways Company to instal a crossover opposite St. Leonards Pier, thus enabling cars to journey back to Hastings when traffic is offered, instead of proceeding three-quarters of a mile to West St. Leonards before turning.

Future of Edinburgh Tramways.—Expert advice was taken by Edinburgh Tramways Committee on December 23 at a meeting, when they further considered the proposed agreement to be entered into between the Tramways Company and the Corporation relative to the transfer of the undertaking.

The Appeal for Auxiliary Drivers at Bradford.—The majority of the men who have responded to the Tramways Committee's appeal to undergo training as motormen are of the higher rank of working men. No application is considered unless the man is over military age or is physically unfit for the Army. The rate of pay will be 7½*d.* per hour.

Drink Curtailment Benefits Conductors.—The position of conductors, says the "Yorkshire Observer," is certainly much easier at Bradford since the curtailment of the hours during which drink may be sold. It will be possible for women conductors to "run" the late cars without much risk of annoyance from drunken passengers.

Suggested Lighting of Car Loops.—Lanarkshire County Council have been considering the subject of the alleged danger to traffic at tramway loop lines, and the manager of Lanarkshire Tramways Company has been consulted with regard to the lighting of all entrances and exits of loops. The Council have decided that in the present circumstances it is not expedient to incur the expense.

Increased Bonuses.—Sheffield Tramways Committee have agreed to recommend an increase in the war bonus now paid to their employees. It will involve a sum of £7,000 a year. Leeds tramway employees have asked for an addition to their bonus of from 2*s.* to 3*s.* a week, and deputations have been received by the General Purposes Committee of the Corporation.

Recruiting Appeals in Montreal.—Tramcars in Montreal display the appeal "Enrolez-vous," and the city is placarded with posters in French and English. The English poster makes a more or less domestic appeal to fight for "wives and children" and for "home." "Rest we indifferent," asks a French poster addressed to the descendants of the soldiers of Montcalm, "when the heart of France bleeds and the voice of blood speaks?"

The Institution of Automobile Engineers.—The next general meeting of this institution will be held on Wednesday, January 12, 1916, in the Hall of the Royal Society of Arts, John Street, Adelphi, W.C., at 8 p.m., when Mr. Geo. W. Watson will read a paper entitled "Back Axles." Cards of invitation to the meeting may be obtained on application to the Secretary of the Institution of Automobile Engineers, 28, Victoria Street, S.W.

A Bradford-Baildon Extension.—Bradford Tramways Committee and Baildon Urban Council have agreed that when rates of interest and construction costs are at the level at which they stood in January, 1914, the Corporation should apply to Parliament for power to construct and work a tramway from Baildon Bridge to Station Road, Baildon. The Provisional Order already obtained has lapsed.

Foolish Conduct.—A series of bomb or other explosive reports came from a York barracks at 10 p.m. on Christmas Day, causing great alarm. Lights were at once extinguished in streets and buildings, and the tramcars stopped running. At Marylebone police court on December 23 the magistrate regretted that he could not order a whipping in the case of a youth who caused great commotion by placing a fog signal on a tramway rail in Kentish Town.

Wood-Milne Tires in India.—Although the home demand for Wood-Milne pneumatic and solid tires continues greater than ever, this firm are not neglecting that most important branch of the nation's business, the export trade. Mr. A. D. McHaffie is responsible for the management of "Wood-Milne" (India), Ltd., with branches at Calcutta (70, Bentinck Street) and Bombay (201, Hornby Road, Fort). Mr. McHaffie, who is a well-known figure in Indian motoring circles, and is very optimistic regarding future business, sailed in October, and his arrangements are now practically complete.

Blackpool Contract Tickets.—Supported as the clamour of the contract ticket-holders was by the Council, the Tramways Committee have had to abandon their support of the general manager's recommendation for increasing the price from £3 to £4 10*s.* for the whole system. Mr. C. Furness has shown that the loss on these tickets amounts to more than £2,000 per annum, and at a meeting of the Committee on December 23 he advised that the issue should be abolished. The Committee, however, agreed that the old price of £3 per annum should stand.

Volunteer Motormen for Portsmouth.—In response to the appeal made by Councillor J. Timpson, chairman of the Tramways Committee a fair number of men have come forward to be trained as motormen, several members of the Council being among them. Mr. W. R. Spaven, the general manager, has had 17 of them under instruction, and those who pass the prescribed examination will be employed in shifts of not less than four hours. A number of paid motormen have also been secured from among men rejected by recruiters, and early in 1916 it is hoped that the pre-war time-tables will be restored.

Bristol Corporation and the Tramways Company.—In pursuance of the powers conferred by the Special Acts Extension of Time Act, 1915, the Board of Trade have made an Order extending the period during which Bristol Corporation are entitled to give notice under Section 43 of the Tramways Act, 1870, of their intention to exercise the option vested in them of purchasing the Bristol Tramways undertaking for the period of one year, viz., from October 31, 1915, to October 31, 1916. Power is given under the Act to make an application for a further extension of time should such a course be considered necessary.

Obstruction of Cars at Railway Crossings.—Hull Tramways Committee have appointed a sub-committee for the purpose of endeavouring to secure a remedy for the delays to cars entailed by railway shunting over the level crossings on every tramway route. The Lord Mayor (Alderman Hargreaves) stated that the Board of Trade Regulations, made eight or ten years ago, were out of date, and were not applicable to the new railway methods of having trains made up of 70 or 80 trucks passing along so slowly that the street traffic at the level crossings was held up for several minutes. Mr. McCombe, the manager, expressed the opinion there was shunting at the crossings that was illegal.

Locomotive Exports.—Builders of locomotive engines in this country have been busily employed during the past year, although the returns of the exports do not approach the figures for 1914. In that year a great deal of export business came to this country owing to the cancellation of orders placed in Germany. During the past five years the declared value and tonnage of locomotives exported have been as appended:—

	£	Tonnage.
1911	2,075,902	43,285
1912	1,925,004	35,473
1913	2,579,123	43,892
1914	3,654,840	58,246
1915	2,357,211	39,471

Board of Trade Inquiry.—At the Board of Trade inquiry into the Birmingham accident that occurred on November 12, as the result of which three persons have died, George Owen, the motorman, said he could not say why the brakes refused to act, unless there was an open circuit or a bad rail. The Inspector (Colonel Druitt): It could not have been a bad rail with that heavy rain. Mr. R. H. Dickinson, rolling-stock engineer, said the magnetic and hand-brakes were tested after the accident and worked all right. He thought the driver must have been going at too high a speed, and threw his magnetic brake right over, instead of notching it in the ordinary way, and there being no sand to use, that had the effect of picking up the wheels, which went over on to the roadway. At the speed at which the car was said to be travelling by Owen, it should have turned the curve all right if the wheels had been allowed to rotate. The inquiry was closed.

Dismissed Conductor's Claim for Holiday Pay.—His Honour Judge Benson has reserved judgment until January 7 in an action brought against Sheffield Corporation in the County Court by an ex-tramcar conductor. The claim was for £1 16*s.* wages, in lieu of a week's holiday in 1915. The Union of Tramway and Vehicle Workers had instructed Counsel in support of the claim, which was based on

Digitized by Google

a resolution passed by the Corporation in 1907, granting to the tramway employees seven days' holiday with pay between April 1 and October 31 each year. In 1914 the holiday list was suspended owing to the war, and men unable to have holidays were paid a week's wages. Plaintiff, however, was dismissed on July 27, and when leaving he asked for the holiday pay, but was referred to Mr. Fearnley, the general manager. He had failed to secure an interview with that gentleman. For the Corporation the contention was advanced that they were entitled to exercise the right of dismissal at any time between the beginning of April and the end of October without rendering themselves liable for a breach of contract or for payment of a week's wages in lieu of holiday. If the man was dismissed in proper form his right under the contract ceased.

PERSONAL.

Mr. J. W. Bachelor, of Hendon, has been appointed station superintendent at Walthamstow Council's electricity works.

Mr. R. H. Scotson, deputy manager at Middlesbrough, has been appointed borough electrical engineer.

Mr. W. G. Snell, tramways manager to Perth Corporation, has attested for the Army Reserve.

Mr. E. Combdy, of Rugby, has been appointed mechanical engineer at Huddersfield Corporation electricity works.

Mr. E. Lunn has been appointed station superintendent at Huddersfield electricity works, the vacancy having been created by the death of Mr. Whitwam.

Mr. J. A. Forde, general manager and electrical engineer, Isle of Thanet Electric Tramways and Lighting Company, has attested for military service under Lord Derby's recruiting scheme.

Major Fred Coutts, 5th Black Watch, has received the Territorial Officers' Decoration for twelve years' service. Major Coutts is general manager and electrical engineer to Paisley Tramways Company.

Councillor D. T. J. Lyle has been re-elected chairman of Maidstone Corporation Light Railways Committee. By an error in a previous issue it was mentioned that another councillor had been appointed chairman.

Mr. Cottle, borough surveyor of Douglas, has been congratulated by the Corporation upon being offered a commission as lieutenant in the Royal Engineers. His position is to be kept open for him and the difference between his salary and the army pay made good..

Mr. G. Montague Harris, secretary of the County Councils Association, has been appointed acting clerk of the East Sussex County Council during the absence on military service of the clerk and deputy clerk.

The Directorship of Labour Supply.—Mr. James Currie, C.M.G., has been appointed to give effect to the policy of the Labour Supply Department of the Ministry of Munitions in relation to training of munition workers. Mr. Currie was principal of Gordon College, and Director of Education in the Soudan from 1900 to 1914.

Mr. Salt, electrical engineer to Torquay Council, has been given leave of absence to join the army. For the present the assistant engineer will carry out his duties. The local tribunal will be asked to allow the department to retain the five eligible men remaining. Twenty-four others have enlisted.

Veteran French Engineer as a Sapper.—Corporal Charles Surrugue, 9th Company, 6th Regiment of Engineers of the French Army, is a civil engineer, and is 76 years of age. Before the war he was the superintendent of construction and upkeep of the light railways in the Department of the Yonne. He designed the Arras-Etaples branch railway in 1872. In that year he turned the first sod of the station at Saint Pol-en-Ternoise, in the district where, 44 years later, he was to use the pickaxe as a private of sappers. In the war of 1870 Corporal Surrugue served in the army of General Faidherbe. Military engineers were very scarce at that time, and he had been called up as a civil engineer and given the rank of captain. He was twice mentioned in dispatches. After the war he occupied himself with municipal affairs in Auxerre, where he was Mayor for twelve years. He volunteered for service in July last, and has just been awarded the Croix de Guerre.

CONTRACTS AND ORDERS.

Singer & Co., Ltd., Coventry, have received an order for motor-cars from the War Office.

Limner Asphalte Paving Company, Ltd., have received a contract from Westminster City Council for the maintenance of the asphalte carriage way of Victoria Street for a period of five years at £1,629.

Glasgow Tramways Committee have accepted the tender of the British Insulated and Helsby Cables, Ltd., for the supply of copper trolley wire.

Public Services Tender Board, Wellington (N.Z.) have accepted the tender of Turnbull and Jones, Ltd., for the supply of 120 miles of copper cable, at £3,460. There were seven tenders, the highest being £4,269.

FINANCIAL REPORTS AND MEETINGS.

Motor Owners' Petrol Combine.—The announcement was made on December 29 that payment of interest on the 6 per cent. first debentures will be deferred.

Insurance of Portsmouth Tramway Properties.—In a report on the above subject the Tramways Committee suggest that the policy should be for £100,000, equal to two-thirds of the actual values. They hope to obtain an all-round rate of 1*s.* 6*d.* per cent., less 15 per cent. agency commission, and they suggest that the premium be charged against the earnings of the existing Insurance Fund, which amounted on March 31, 1915, to £20,535. The annual interest thereon is approximately £800. It is also suggested that against these earnings of £800 per annum all other classes of existing insurances be charged, viz.: Corporation workmen, £161; boiler, £17; Fidelity guarantee, £3; aircraft and bombardment, £532; new fire insurance, £63; total, £776.

Power Gas Corporation.—Sir A. Mond, who presided at the annual meeting, said the company had recovered from the slump of the first few months of the financial year, and were now extremely busy night and day on engineering work. In view of the profits, the Board decided to increase the dividend, and the directors were in a position to pay 6 per cent. per annum on the ordinary shares, less income-tax, which was the largest they had paid for several years. The amount placed to reserve was the maximum allowed by the articles. The balance sheet showed a profit of £20,743, to which was added £7,479 brought forward, making altogether £28,222. This the directors proposed to apply as follows:—To reserve fund (created in terms of Article III.), £4,140; dividend at 6 per cent. per annum upon the ordinary shares, less tax, £14,977, leaving to be carried forward £9,105.

Isle of Thanet Electric Tramways and Lighting Company.—Mr. A. R. Monks, presiding at the annual meeting, said that notwithstanding the trying year on the East Coast owing to the war, the financial position of the company was better than it had been for many years. There had been a loss of £11,028 in traffic revenue, and £3,637 on sales of electricity, equal to 33 per cent. In the general expenditure there was a saving of £2,038, and in power station costs of £2,766. Interest on loans had increased by £500. The directors had only taken half fees. They regretted they could not pay the dividend of 2½ per cent. on the preference shares foreshadowed in the last report; the money must be conserved to pay for new plant. After Dr. Moody, a tramway director in another locality, had urged the need of putting the loans on a permanent basis, even if 6 per cent. interest had to be paid, the report was adopted.

British Columbia Electric Railway Company.—For the year ended June 30 the net revenue was £180,661. It has been decided to draw £60,000 from the reserve and pay 2½ per cent. on the preferred ordinary stock, leaving £6,667 to carry forward. The directors propose to pay the dividend for the current year on the 5 per cent. preference stock out of the reserve, being of the opinion that the company's financial position justifies that course. They are unable to hold out any hope of being able to recommend the payment of any dividend on the preferred ordinary or deferred ordinary stocks for the present year. Owing to the war, and especially to the resultant paralysis of the shipping trade, commercial depression of the most acute severity has prevailed throughout British Columbia, which has brought about an almost complete cessation of expenditure by the Government, municipalities, railways and other large undertakings. On June 30 the wages agreement between the company and its employees terminated, and the Board of Arbitration made an award, reducing the rate of wages paid to the employees by about 8 per cent., which will represent a saving of about £22,000 per annum. The expenditure on capital account during the year has been $875,558, which compares with $4,110,327 for the previous year.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended December 18, give total receipts of £174,134, or £14,367 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £75 19*s.* 6*d.* per mile of single track, and last year at the rate of £70 10*s.* 1*d.*, thus showing an increase for the past week of £5 9*s.* 5*d.* per mile open. The principal London tramways have temporarily discontinued the publication of traffic returns.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Dec. 30	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	63¾	63½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	78/6xd	82/6
4%	4%	Do. 4% Deb. ...	100	91	74xd	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	77½xd	79⅞
5%	5%	Do. 5% Deb. ...	100	96	80½	81
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1 5/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94¾xd	94¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10 1/16	10 1/16
4½%	4½%	Do. 4½% Deb....	100	96	87½xd	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98	98
$½	$½	Brazilian Trac. & Power Ord. ...	$100	66	51¼	51¼
$1½	$1½	Do. 6% Cum. Pref.	$100	97	91¼	92xd
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅜	6 5/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	40	40
6%	5%	Do. Pref. Ord....	100	106	41	41
5%	5%	Do. 5% Cum. Pref.	100	103	60	60
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	62½	62½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75	75
70/-	70/-*	Do. 7% Pref.	100	55½	46	46
—	—	Do. 6% Pref. Ord.	100	17½	15	15
—	—	Do. Def. Ord.	100	11	8¼	8¼
5%	5%	Do. 5% Deb.	100	92	80	80¼
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87	87
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	5⅞	6⅛
1/3	1/3	City of B.A. Trams.	5	5¾	93/1½	93/1½
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85½	85½
5/-	5/-	Dublin United Tramways ...	10	—	£10 1 6	£10 1 6
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	77½	77½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84⅛	77	77xd
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	9/15/6	9/15/6
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	86½	86½
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	15/32	2/4	2/4
6d.	6d.	Do. 5% Pref.	1	9/16	9/6	9/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	58¾xd	58¾
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	91½xd	91½
5%	5%	Do. 5% Inc. Deb.	100	88½	84	84
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51xd	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	105¼	105¼
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	69	69
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	73⅝	73¾xd
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	82½xd	82½
$1¾	$1¾	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	48½	48½
6%	6%	Do. 6% Mt. Bds.	100	76	44½	44¾
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	93½	93½
1/2⅜*	1/-*	National Steam Car	1	15/32	13/-	12/6
9⅜d.*	9⅜d.*	New General Traction	1	½	7/9	7/9
1/2⅜	6d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	67/6	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/-	10/-
10d.	8d.	Provincial Trams. Ord.	1	⅝	17/6	17/6xd
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91⅞	91¾
5%	5%	1st. Mt. 5% 50 yr.	100	89½	77¾	79
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90	90
5%	5%	Do. 5% Perp. Deb.	100	99½	82	82
—	—	Singapore Elec. Trams	5/-	¼	2/9¾	2/9¾
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	94	94
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	86	86
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	7/7½	7/7½
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	88/-	86/-

* Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1913-4	Latest Return. 1914-5.	Aggregate. Wks.	Aggregate. 1914-5.	Increase or Dec.
Anglo-Argentine	Dec. 23	£52,765	£52,156	51	£2,607,179	—£133,550
Auckland.....(28 days)	Nov. 28	19,391	20,910	20	104,036	— 482
Ballarat and Bendigo ...	Oct. 10	3,313	3,402	28	21,511	— 2,421
Brazilian Trctn. Mlrs.	Nov.	5,929,730	6,336,000	48	70,586,110	+3,245,122
Brisbane	Nov.	28,600	31,120	48	338,074	+ 20,853
British Columbia.....$	Oct.	661,000	538,826	18	2,073,697	— 602,654
Buenos Aires Lacroze ...	Nov. 5	42,256	42,603	22	207,402	— 1,364
Burmah Tramway ... Rs.	Dec. 25	3,115	3,506	...	74,963	+ 6,579
Calcutta.....Rs.	„ 25	62,574	67,838	51	3,361,496	— 29,738
Cape Town	Nov.	...	13,870	...	...	...
Carthagena & Herrerias..	Nov.	1,379	2,090	48	19,839	— 4,223
Cordoba	Nov.	12,468	13,785	30	111,123	+ 3,784
East India	Nov.	2,029	2,065	17	8,454	+ 326
Hong Kong .....$	Nov. 20	9,526	10,895	47	516,574	— 12,198
Kalgoorlie	Sept.	2,864	2,997	39	25,116	+ 1,136
La Plata	Nov.	4,540	4,545	48	46,836	— 4,096
Lima	Nov.	29,712	30,703	48	351,169	— 9,612
Lisbon .....Escu.	Nov.	...	170,130	...	...	...
Madras (14 days).....Rs.	Dec. 15	24,471	28,666	48	672,827	+ 37,622
Manila .....$	Nov.	129,000	129,447	48	1,353,983	— 116,711
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Sept.	...	61,211	...	...	...
Mexico .....$	*	...	...	...	...	...
Montevideo	Nov	27,081	28,407	4	28,407	+ 1,326
Port Elizabeth	Nov.	...	3,110	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Nov.	4,405	5,028	48	53,243	— 1,819
Shanghai .....$	Nov. 17	25,519	28,278	...	...	...
Singapore .....$	Nov. 20	9,414	11,473	...	532,567	+ 5,645
Toronto.....$	Oct.	849,636	792,001	44	7,942,606	— 529,137
Winnipeg	Oct.	330,562	286,146	44	2,799,595	— 602,907

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1914	Latest Return. 1915	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1914-15	Incr. or Dec.
Aberdeen Corporation...	Dec. 22	£1,551	£1,709	+ £158	29	£52,743	+ £2,897
Accrington Corp.....	„ 22	504	551	+ 47	38	21,132	+ 545
Ayr Corporation	„ 25	220	256	+ 36	32	12,787	+ 711
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 26	1,255	1,422	+ 167	38½	53,203	+ 4,282
Birmingham Corp.	„ 18	12,759	15,600	+2,841	38	535,978	+ 76,504
Blackburn Corp.	„ 22	1,061	1,128	+ 67	38 9/7	49,568	— 216
Blackpool & Fleetwood.	„ 25	355	316	— 39	51	38,628	— 390
Blackpool Corp.	„ 23	649	689	+ 40	39	68,094	+ 1,721
Bolton Corporation.....	„ 26	2,726	2,772	+ 46	39	104,018	— 1,533
Bournemouth Corp.....	„ 29	1,867	2,037	+ 170	39	83,754	+ 3,876
Bradford Corporation ...	„ 25	6,258	6,045	— 213	38	251,258	+ 10,165
Brighton Corporation ...	„ 26	914	954	+ 40	38⅔	43,909	+ 379
Bristol	„ 24	9,715	12,698	+2,983	51½	493,794	+ 53,713
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 25	1,656	1,700	+ 44	39	62,051	+ 1,399
Burton-on-Trent Corp...	„ 26	308	315	+ 7	39	11,013	— 403
Bury Corporation.....	„ 19	1,133	1,216	+ 83	37⅔	51,205	— 415
Cardiff Corporation.....	„ 11	2,418	2,594	+ 176	36	98,774	— 2,583
Chatham & District.....	„ 23	1,087	1,139	+ 52	51	59,056	+ 9,586
Chesterfield Corp.	„ 23	308	273	— 35	38	10,337	— 25
Colne Corporation	„ 18	211	225	+ 14	...	...	...
Cork Electric	„ 23	530	496	— 34	51	25,457	— 10
Croydon Corporation ...	„ 17	1,627	1,690	+ 63	37	68,849	+ 4,303
Derby Corporation	„ 25	990	1,015	+ 25	38⅔	40,506	+ 1,285
Dover Corporation	„ 11	229	276	+ 47	36	11,592	+ 2,087
Dublin & Lucan	„ 17	114	105	— 9	24	3,592	+ 66
Dublin United	„ 24	6,375	6,938	+ 563	51	311,437	+ 11,072
Dundee City	„ 22	1,245	1,331	+ 86	31⅔	43,122	+ 2,297
East Ham Corporation	„ 25	1,402	1,359	— 43	37	50,319	+ 5,394
Exeter Corporation.....	„ 24	337	392	+ 55	38	14,647	+ 846
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	„ 25	20,257	22,290	+2,033	30	646,360	+ 46,139
Glasgow Subway.....	„ 25	1,101	1,246	+ 145	51	55,033	+ 2,200
Glossop (U. Elec. Supp.)	„ 25	113	132	+ 19	52	6,522	+ 328
Halifax Corporation.....	„ 21	1,982	2,010	+ 28	38	85,100	+ 908
Hastings & District.....	„ 23	784	849	+ 65	51	69,283	— 200
Huddersfield Corp.	„ 18	2,281	2,437	+ 156	37	10,064	+ 13,473
Hull Corporation	„ 25	3,095	3,217	+ 122	38	118,322	— 2,303
Ilford U.D.C.	„ 25	655	636	— 19	38	25,004	+ 2,894
Ilkeston Corporation ...	„ 22	120	128	+ 8	38	5,125	+ 193
Ipswich Corporation	„ 25	431	499	+ 68	37	21,264	+ 3,400
Isle of Thanet	„ 25	307	258	— 49	12	3,159	— 968
Kilmarnock Corp.	„ 18	144	153	+ 9	31	5,227	+ 157
Lanarkshire	„ 23	1,726	1,984	+ 258	51	100,948	+ 6,067
Lancashire United	„ 22	1,502	1,546	+ 44	51	87,875	+ 5,265
Leeds City.....	„ 18	8,003	8,641	+ 638	38	336,960	+ 25,968
Leicester Corporation ...	„ 25	2,936	3,258	+ 322	52	156,661	+ 9,621
Leith Corporation	„ 25	668	749	+ 81	32	24,648	+ 1,577
Leyton U.D.C.....	„ 23	1,588	1,627	+ 39	38	61,989	+ 9,120
Liverpool Corporation...	„ 25	13,225	14,283	+1,058	51⅔	684,156	+ 11,804
Llandudno & Colwyn B.	„ 24	179	204	+ 25	3½	628	+ 40
London County Council	Sept. 22	41,976	46,960	+4,984	25	1,095,822	— 4,285
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	Dec. 19	166	123	— 42	11½	1,445	— 599
Maidstone Corporation..	„ 23	206	204	— 2	38	8,446	+ 254
Manchester Corp.....	„ 25	16,568	17,467	+ 899	38	689,289	+ 21,732
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	„ 25	192	188	— 4	38½	7,527	+ 296
N'castle-on-Tyne Corp.	„ 25	6,307	5,920	— 387	38	241,754	+ 27,907
Newport (Mon.) Corp....	„ 25	735	856	+ 121	39	32,436	+ 731
New St. Helens & Dist.	„ 22	870	929	+ 59	25	26,249	+ 2,646
Northampton Corp.....	„ 24	624	794	+ 170	38⅔	28,032	+ 4,918
Nottingham Corp.....	„ 23	3,682	3,804	+ 122	38	142,936	+ 10,060
Oldham Corporation ...	„ 26	2,246	1,978	— 268	40	90,710	+ 3,640
Portsmouth Corp.....	„ 25	1,905	1,994	+ 89	39	96,948	...
Preston Corporation.....	„ 22	916	1,007	+ 91	38	37,003	+ 1,476
Provincial	„ 25	2,025	2,041	+ 16	12½	25,123	+ 1,409
Reading Corporation.....	„ 9	656	786	+ 130	36⅓	28,820	+ 3,024
Rhondda Tramways.....	„ 16	1,085	1,150	+ 65	50	59,037	— 2,033
Rochdale Corporation...	„ 25	1,713	1,659	— 54	37½	65,869	+ 2,832
Rotherham Corp.....	„ 15	948	1,199	+ 251	37	43,353	+ 5,113
Salford Corporation.....	„ 27	4,761	5,193	+ 432	38⅔	201,627	+ 4,876
Sheffield Corporation. ...	„ 26	8,609	8,830	+ 221	39½	354,247	+ 48,173
Southampton Corp.....	„ 22	1,364	1,541	+ 177	38	57,650	+ 6,279
Southend-on-Sea Corp...	„ 22	695	623	— 72	38	31,979	— 8,607
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 18	698	728	+ 30	37⅔	29,985	+ 1,230
Sunderland Corp.....	„ 26	1,553	1,625	+ 72	39	58,337	+ 739
Sunderland District... ..	„ 15	449	572	+ 123	7	3,761	+ 250
Swindon Corporation ...	„ 22	192	196	+ 4	38	7,533	+ 647
Torquay Tramways.....	„ 16	375	386	+ 11	50	27,061	— 422
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	„ 22	534	505	— 29	28	14,925	— 664
Wallasey Corporation ...	„ 25	1,087	1,182	+ 95	38⅔	49,727	+ 739
Walsall Corporation.....	„ 25	797	881	+ 84	52	38,533	+ 5,702
Walthamstow U.D.C....	„ 25	770	806	+ 36	39	34,915	+ 3,355
Warrington Corp.....	Nov. 25	394	438	+ 44	34	15,669	+ 750
West Ham Corporation	Dec. 23	3,214	3,280	+ 66	38	118,835	+ 10,093
Wigan Corporation	„ 23	1,679	1,625	— 54	38	58,749	+ 2,706
Wolverhampton Corp....	„ 29	1,158	1,373	+ 215	39	43,995	+ 2,484
Yorkshire (W. Riding)...	„ 26	1,728	1,726	— 2	52	81,929	+ 6,654

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

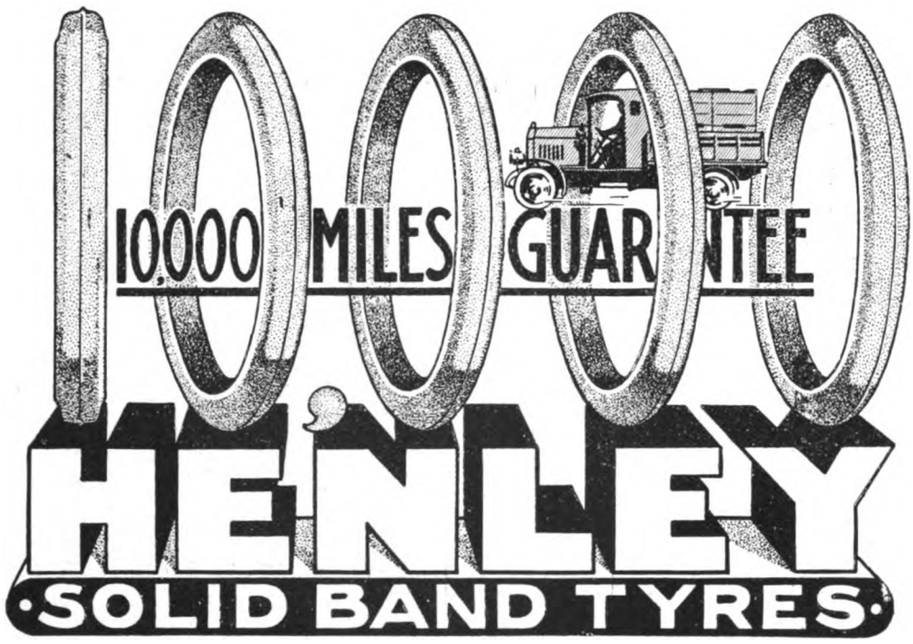
COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google



Manufacturers:

W. T. HENLEY'S TELEGRAPH WORKS CO., LTD.

Tyre Department:

18, NEW UNION STREET, MOORFIELDS, E.C.

Telephone No.: 3886 London Wall. Telegrams: "Hetewo:ol, Ave, London."

COMPARATIVE TRAMWAY ACCOUNTS.

The latest Municipal Tramway Accounts are summarised in

THE TRAMWAY AND RAILWAY WORLD

OF DECEMBER 9, 1915.

The capital and working reports are clearly and systematically arranged so that any required fact can be readily ascertained, while comparisons of results of the different systems can easily be made.

Particulars are given under the following heads:—

Capital Account :—
- Borrowing Powers.
- Borrowing Powers Exercised.
- Unexhausted Borrowing Powers.
- Capital Expenditure per mile of Single Track.
- Loans Outstanding.
- Sinking Fund and Loans Repaid.
- Depreciation, Renewal and Reserve Funds.

Gross Receipts :—
- Traffic.
- Other Revenue.
- Total.

Working Expenses :—
- Traffic.
- General.
- Repairs and Maintenance.
- Power.
- Total.

Gross Profit on Working.

Reductions from Gross Profit :—
- Interest.
- Sinking Fund.
- Income Tax.
- Depreciation and Renewals.
- Sundries.
- Total.

Net Surplus or Deficit.

Appropriation of Net Surplus :—
- Carried Forward.
- Reserve.
- Relief of Rates.

Percentage of Operating Expenses to Total Revenue.

Receipts per Car Mile :—
- Average Total per Car Mile.
- Average Traffic Total per Car Mile.

Operating Expenses per Car Mile :—
- Traffic.
- General.
- Repairs and Maintenance.
- Power.
- Total.

Average Operating Expenses per Car Mile (excluding Power Cost).

Energy Consumption :—
- No. of B. of T. Units used.
- Cost per Unit.
- Units used per Car Mile.

Traffic Records :—
- Population served.
- Car Mileage.
- Passengers Carried.
- Passengers Carried per Car Mile.
- Average Fare per passenger.
- Average Journeys per head of population served per annum.
- Average Car Miles per day per Car.
- Traffic Revenue per Mile of Single Track.
- Average Traffic Revenue per annum per head of population served.
- Operating expenses per passenger.
- Average distance of 1d. fare.
- Average fare charged per mile.
- Average speed per hour.
- Average Car hours per day.
- Average number of Cars in use daily.
- Number of Cars in stock.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 2.] LONDON, SATURDAY, JANUARY 8, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF CROYDON.

TRAMWAYS DEPARTMENT.

TENDERS FOR SUPPLY OF GENERAL STORES AND GOODS.

Notice is hereby given that the Council are prepared to receive Tenders for the supply and to the extent ordered by them of General Stores and Goods for their Tramways Department for the year ending March 31, 1917, particulars whereof are set forth in schedules marked "A" to "M" inclusive, printed copies of which may be obtained on application to the Tramways Manager, Tramways Depôt, Thornton Heath, Surrey.

Schedules, Forms of Tender (upon which alone tenders will be received), with Particulars and Conditions of Contract, may be obtained from the Tramways Manager, at the above address, where samples are to be tendered to; these samples are exhibited for examination at the Tramways Depôt aforesaid.

Sealed tenders (filled up as directed, which will only be received subject to the Schedules, Particulars, Conditions of Contract and Form of Tender) must be endorsed "Tender for General Stores (Tramways Department)," and delivered to me not later than Ten o'clock in the forenoon of MONDAY, the 24th day of JANUARY, 1916.

The Council will only consider Tenders from persons stating they have examined the exhibited samples, and do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of accepting Tenders either in whole or part as they may think fit.

Town Hall, Croydon. JOHN M. NEWNHAM, Town Clerk.
January 1, 1916.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery and erection of the following:—

(a) Sub-Station Converters.
(b) Traction Boosters.
(c) High and Low Pressure Steam and Water Piping.

Specifications, drawings, and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed, and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Tuesday, the 18th inst.

The firm entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any tender.

Town Hall Manchester. THOMAS HUDSON, Town Clerk.
January 3, 1916.

POSITION WANTED.

TRAFFIC SUPERINTENDENT.

Advertiser, with 15 years' experience of tramway work, seeks position as Traffic Superintendent or Chief Inspector. "M," care of THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

POSITIONS VACANT.

CITY OF BIRMINGHAM.

ELECTRIC SUPPLY DEPARTMENT.—APPOINTMENT OF SHIFT ENGINEER.

Applications are invited for the position of Shift Engineer at the Chester Street Generating Station, Aston Manor.

Applicants must have had a sound mechanical and electrical engineering training, and must have had previous experience of a similar kind in a large electric generating station, from which extra high tension, three-phase, and low tension direct current supplies are given.

Applications (made on forms which can be obtained from the Secretary of the Electric Supply Department), accompanied by not more than three testimonials as to experience, ability and character, must reach the undersigned not later than Monday, January 17, 1916.

R. A. CHATTOCK,
Electric Supply Offices, City Electrical Engineer and Manager.
14 Dale End, Birmingham.
January 4, 1916.

INDIAN PUBLIC WORKS AND STATE RAILWAY DEPARTMENTS.

The Secretary of State for India in Council will in 1916 appoint a number of Assistant Engineers to the Indian Public Works and State Railway Departments.

Candidates must be British subjects, and, save as provided in Appendix III. to the Regulations, must not be less than 21 and not more than 24 years of age on July 1, 1916. They must have either obtained one of certain recognised University degrees or other distinctions in Engineering, or have passed the Associate Membership examination of the Institution of Civil Engineers.

Applications must reach the India Office by April 1, 1916. Printed forms, together with information regarding the conditions of appointment, may now be obtained from the Secretary, Public Works Department, India Office, London, S.W.

India Office, London.
December, 1915.

GOVERNMENT OF MALTA.

Assistant Electrical Engineer required by the Government of Malta for the Electric Lighting Department.

The Engineer appointed will be required to take charge of shifts at the Central Station, and to carry out wiring or any other electrical work that may be required.

Applicants must have had experience in single phase alternating current stations: those acquainted with Belliss engines and Babcock and Wilcox boilers preferred.

Engagement for three years, with possible extension. Salary, £130–£150 per annum. First-class passages. No quarters provided. Strict medical examination, and vaccination if necessary.

Applications in writing, with full particulars, to Messrs. Preece, Cardew, Snell and Rider, 8, Queen Anne's Gate, S.W., quoting M/Malta 7951.

No person engaged on Government work need apply.

ABERTILLERY URBAN DISTRICT COUNCIL.

ELECTRICITY WORKS AT ABERBEEG (MON.).

APPOINTMENT OF A PRACTICAL ELECTRICIAN.

The Council invite applications from properly qualified persons to undertake the position of Practical Electrician, accustomed to three-wire overhead D.C. system. One acquainted with Diesel oil engines or suction gas plant preferred.

Salary, £2 10s per week.

Applications, stating age, qualifications, etc., with two recent testimonials, to be sent to the undersigned forthwith.

By Order,
Council Offices, Abertillery, Mon. WILLIAM GAIT,
January 4, 1916. Clerk to the Council.

SWITCHBOARD ATTENDANTS.

CORPORATION OF WAKEFIELD ELECTRICITY DEPARTMENT.

Wanted, two Switchboard Attendants at the Wakefield Corporation Electricity Works. Applicants must already have some experience of the working of a large A.C. switchboard. State salary required. The person engaged will be "on War Service," but no applications are desired from those so engaged at present without the full consent of their employers. Written applications, enclosing copies of testimonials, to be addressed to the CITY ELECTRICAL ENGINEER, Wakefield.

Digitized by Google

Now Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

MEMBER INSTITUTION OF MECHANICAL ENGINEERS;
MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND;
MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS;
MEMBER MUNICIPAL TRAMWAYS ASSOCIATION;
FELLOW PERMANENT WAY INSTITUTION.

SOME PRESS OPINIONS:

"The author of this book has produced an excellent book of reference."—*The Engineering Review.*

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school."—*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated."—*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time."—*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management."—*Municipal Journal.*

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Garrould's

TO H.M. WAR OFFICE, H.M. COLONIAL OFFICE, INDIA OFFICE, ST. JOHN AMBULANCE ASSOCIATION, BRITISH RED CROSS SOCIETY, LONDON COUNTY COUNCIL, GUY'S HOSPITAL, &c.

SPECIAL DESIGNS
FOR
WOMEN TRAMWAY CONDUCTORS & DRIVERS
ALSO
Railway Ticket Inspectors.

Complete Costume of Blue Cloth. The Coat lined with wool, with Gilt Initials upon the collar. . .

Coat, Collar, Cuffs, and Skirt are bound with leather. . . . . .

2 Guineas each.

Special Reduction for Quantities of 100 and over. Sample Garment sent - - - for inspection. - - -

***A LARGE ORDER** for Coats and Skirts has just been completed for*

The Great Western Railway Co.,
London and North-Western Railway Co.,
The Metropolitan Tramways, Ltd.,
&c., &c.

CONTRACTORS to UNIONS, ASYLUMS
FOR
LINENS. PRINTS, WARD DRESSES, &c., &c.

E. & R. GARROULD,
150 to 162, EDGWARE ROAD, LONDON, W.
Telegrams: "Garrould, London."
Telephones: 5320, 5321, 6297 Paddington.

Pole Paints

As supplied to important Companies at home & abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples & Prices on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England

TRAMWAY SUPPLIES, Ltd.,

Tramway Engineers,

Sole Selling Agents for S. Dixon & Sons' Tramway Material,

160, WOODHOUSE LANE, LEEDS.

Sole Manufacturers of

TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controllers, Leeds."
Telephone: 3488 Leeds.

OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.

For Places Abroad—Thirty Shillings per annum.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JANUARY 8, 1916.

TRAMWAYMEN DECLARED MUNITION WORKERS.

An amendment of great importance to tramway undertakings was on January 4 in the House of Commons inserted in the Munitions of War (Amendment) Bill, which was being considered on report. Clause 7 extends the definition of munitions work as contained in the original Act, and sets out various classes of work that are declared to be munition work. Before the Christmas recess the late Sir George Scott Robertson had given notice of an amendment to include in the extended definition "the supply of tramway facilities." In the interval the honourable Member died. On the amendment being reached on January 4, Mr. Lloyd George, Minister of Munitions, moved the amendment himself, and it was at once agreed to.

Therefore paragraph (*c*) of the extended definition of munitions work now reads as follows:—"the supply of light, water or power, or the supply of tramways facilities in cases where the Minister of Munitions certifies that such supply is of importance for the purpose of carrying on munitions work, and the erection of buildings, machinery and plant required for such supply." In response to an appeal by Mr. Harris, the Minister of Munitions promised to consider whether he could include omnibus facilities in the amendment.

We may now hope that tramway authorities will no longer be deprived of skilled workers or men otherwise absolutely necessary, and that such men will not go either to the Army or to munition factories except by special arrangement. Many provisions of the original Act will, of course, now apply to tramway employees. The extension of the scope of the Act has not been granted in a hurry, and it will simplify the task of managers in claiming at least their motormen and workshop hands as indispensable. The self-sacrificing work that both tramway employers and their men have accomplished in the interest of the Forces since August, 1914, is proof that neither party will view the present respite in a niggardly spirit. Every man who can possibly be spared will be permitted to render the more active service to the Empire that several millions of free citizens are now giving either in face of the enemy or in the workshops. Some undertakings now possess little more than a residue of their original motormen and conductors, and the majority of these are from one cause or another exempted from joining the Services. The exceptions to this statement are mainly undertakings in centres where there is great activity resulting from Government work, and here the anxiety for the future has led to experiments being made in the training of women as drivers. Possibly the concession now granted by the Minister of Munitions will relieve those authorities from the disagreeable task of putting more women on the front platform The amendment of the Act will be received as affording relief to a greater extent than was at one period hoped for. It will be remembered that in July the Tramways and Light Railways Association instructed their Council to endeavour to secure exemption for the skilled workmen only. Increasing enlistments and losses due to men leaving to undertake munition work induced the Council of the Municipal Tramways Association to represent to the Minister of Munitions that any interference of the tramway service would have a serious effect upon the output of munitions in many towns. That conclusion is undeniable, and as long ago as September last the Minister of Munitions was engaged in considering, in consultation with the War Office, whether it was possible to protect tramways against the loss of any of the irreducible minimum of skilled workmen by means of the issue of badges under Section 8 of the Munitions of War Act. As there was some doubt whether work in connection with tramways could be strictly regarded as being work for war purposes within the meaning of the Act, no progress seems to have been recorded until, under the Derby recruiting scheme, tramway workers were placed in the list of reserved occupations from which the men could be called up only by consent of the employers. The amendment affords still more complete protection, particularly in the case of the workmen. Munition manufacturers have been able, by the offer of superior pay, greatly to deplete tramway shops of men whose work was necessary for keeping cars in running order, and though managers had appealed to the Local Tribunals, the latter confessed that they had no power to order the men to remain. Another advantage of coming within the Act is that a safeguard is provided against a hasty strike.

EXCESS PASSENGERS AT LIVERPOOL.

We were misled in our reference last week to the carriage of excess passengers at Liverpool by a statement in a local paper, which implied that passengers were not allowed to stand in the lower saloon. As a matter of fact, Liverpool was the first provincial city in Great Britain to obtain powers from the Board of Trade and the City Council to allow excess passengers to stand in the lower saloon, and this privilege the tramways department has always utilised in the rush hours. Nine is the limit at present allowed, and this number, added to 64, the seating capacity of Liverpool's standard cars, makes a maximum of 73, which, in the opinion of the general manager, is as many as one conductor is capable of handling.

THE LIABILITY TO PRODUCE TICKETS.

Bath Electric Tramways Company on December 30 summoned a lady passenger for refusing to give up her ticket when required to do so by an inspector, or alternatively to pay the fare.

Mr. W. F. Long, the company's solicitor, said the defendant told the inspector that she was nearly at the end of her journey and had thrown the ticket away. She appealed to the conductor, who said she had paid. From the point of view of the company that was not sufficient. The by-law stated that a passenger should on demand, produce his or her ticket or, as an alternative, pay the fare. There had been a case on the same point decided in the High Court, whereby, if a person having bought a ticket, lost it, and was unable to produce it, such person must pay his or her fare over again. Defendant was requested to pay again, but refused. Where a person lost his or her ticket and paid over again, the company were willing to refund the extra money. Defendant had since apologised, and paid the expenses. The company therefore, asked for the dismissal of the summons, being satisfied with the apology and the publicity which the by-law would receive.

Digitized by Google

WOMEN CONDUCTORS.

Belfast Labour Union on January 3 forwarded to Belfast Corporation a letter protesting against the employment of women as car conductors during the war. Alderman J. Tyrrell, chairman of the Tramways Committee, expressed his confidence that the manhood of the city would deal sharply and summarily with any body of men who attempted to interfere with the women conductors. It was a melancholy spectacle that any body of presumably respectable men should adopt such a course at this moment of national crisis. If the necessity arose the Council would employ women. Mr. A. Nance, general manager, had reported, however, that he was satisfied with the results attending the employment of boys.

Seventy girls are at work on the Cardiff cars as conductors, and two women as drivers, while more are training in the latter capacity. Mr. A. Ellis, the general manager, is a convert to the use of women for car work during the war, but as they are naturally more fatigued than men, he has asked the public to pay the fares before going to the top deck. This applies more particularly because the service is not only considerably reduced, but the cars in service are invariably crowded in consequence. The bloomer costume is being provided for the conductors, who also possess a jacket, greatcoat, mackintosh and two hats.

Mr. A. Anderson, superintendent, Oldham, Ashton, and Hyde Tramways Company, replying to a complaint of overcrowding made by a parish council, has stated that enlistments have led to a reduction in the number of cars running, but as women conductors were being introduced, the company hoped to increase the services.

Erith Tramways manager has reported that the difficulties of maintaining the tramway service owing to insufficient staff were becoming most acute notwithstanding that he had made use of inspectors, shed staff and clerical staff almost continually. The Council have authorised him to engage female conductors.

Two hundred women are now working as conductors on the Manchester cars, and the number is increasing every week as the number of men decreases owing to enlistments. The management have received numerous letters testifying to the efficiency and courtesy of the women.

A deputation from Bolton Tramways Committee have visited Oldham and inspected the new uniforms of the women conductors. The members of the deputation expressed themselves as well satisfied.

RAILWAY WORKSHOPS AND MUNITIONS.

In the House of Commons on January 4, Mr. Lloyd George, on consideration of the Munitions of War (Amendment) Bill, moved to recommit the Bill in order to insert a new clause which embodied the results of an agreement arrived at with the Amalgamated Society of Engineers, and the object of which was to give power to the Ministry of Munitions to enforce a minimum wage in munition works. The clause only applied to establishments where they were inviting workmen to suspend their trade union regulations. In other establishments which were not controlled the process of dilution of labour was going on voluntarily.

Replying to a complaint that railway companies were taking advantage of the dilution scheme in their workshops, and to a request that such places should be placed under the control of the Minister of Munitions, Mr. Lloyd George said that with regard to railway establishments, there was a good deal to be said for bringing them under the control of the Ministry of Munitions, but inasmuch as their shell work was only a small proportion of the work they were doing, they objected to be treated as if they were shell factories. If they were put under control they might stop the output of shells and he wanted their assistance in turning out big shells.—The clause was agreed to.

TRAMCAR ACCIDENTS.

A single-truck double-deck car belonging to Glasgow Corporation Tramways left the rails at 1 p.m. on January 2, while travelling from Springburn to Rutherglen. The car was crowded with people who had been visiting at Ruchill Hospital. Two women conductors were collecting the fares. Whilst descending the Bilston Drive hill the car seemed to get beyond control, and swayed from side to side. When nearing a sharp curve the car ran off the rails, and, tilting over to the left, crashed against a high retaining wall, situated at the base of a bank of earth. The car was completely wrecked, and the top cover was forced almost completely away from the body of the car, part of it resting on the embankment. Forty persons were removed to the hospital for treatment, thirteen of the number being detained. One of the conductors was injured. The motorman, a spare driver of considerable experience, escaped unhurt by leaping from the platform just before the collision. Mr. J. Dalrymple, the general manager, has stated that so far as can be learned the brakes were all right, having been tested during the day by the motorman, who is a capable man and was perfectly cool at the time. On the incline there is a "drive cautiously" notice, and a compulsory stop. The motorman was brought before the magistrate at Maryhill police court on the following day, and was remanded.

Since the electrification of Glasgow Tramways in October, 1898, only three serious accidents have occurred. In 1902 a passenger was killed and 27 were injured owing to a car running backwards on the hill at Renfield Street, and colliding with another car, which was forced into a third one. This mishap was caused by the locker-pin of the hand brake of the first car becoming loose. In the next accident a motorman and another man were killed in a collision between a car and two lorries, which was caused by the car running away down High Street.

At Radcliffe, at midday on January 3, a Bury Corporation tramcar was descending the Radcliffe New Road incline, when the wheels skidded on the greasy rails. The motorman could not manage to set the wheels in motion, and the car left the rails at the curve at the foot of the hill. It was forced by the momentum into a shop front, two lorries being driven along before it. Ten passengers sustained slight injuries, and the motorman was the worst sufferer. He was pinned to the door by the wreckage of one of the lorries.

MISCELLANEOUS NEWS AND NOTES.

Restriction of Services at Nottingham.—On account of the lack of car hands every service at Nottingham has had to be curtailed.

A Manchester Collection.—The sum of £538 was subscribed on the Manchester tramcars for the relief of Serbian children.

Books of Tickets.—Announcements have been placed in the Hull tramcars that tickets can be purchased in bundles in advance. No discount is allowed.

Blackpool Contract Tickets.—The Corporation have adopted a recommendation by the Tramways Committee to defer the proposal to revise the charge for annual contract tickets until after the war.

High Price for Old Iron.—Edinburgh Corporation Gas Committee realised £2,700 by the sale of old iron that had been expected to yield only £700.

Henley's Calendars.—We have received from the tire department of W. T. Henley's Telegraph Works Company, Ltd., two attractive calendars for 1916. Copies of these will be sent free of charge to any of our readers who apply for them.

Aberdeen Tramways Track.—The Tramways Committee, as the result of five years' experience of the present system, intend to recommend to the Council that the maintenance of the tramways track should be handed over to the tramways department.

Novel Accident Claim.—Hull Tramways Committee have sanctioned the payment of £25 to a woman who sustained a shock by being struck by a bundle of tickets thrown from one conductor to another.

Omnibuses Needed at Rotherham.—Owing to inability to obtain the necessary omnibuses and drivers, Rotherham Tramways Committee have not been able to inaugurate the proposed motor-omnibus service between Greasbrough and Rotherham.

Motor Cars for Parcels.—Mr. A. Ellis, general manager, Cardiff Corporation Tramways, has stated that if motor cars had been obtainable the parcels department at Christmas would have been developed with relays of motor cars in collection and delivery.

Additional Power Plant at Stalybridge.—The joint Tramways and Electricity Board have agreed to apply for sanction to borrow £20,000 for installing additional power plant in order to meet the increased demand for power.

Power Supply Extension at Leicester.—For the purpose of supplying cables to meet the increased demand for power by firms engaged on Government work, the Council have been advised to expend a sum of £14,000 to meet immediate requirements, and the anticipated requirements of the near future.

Chas. Macintosh and Company's War Relief Fund.—The employees of Chas. Macintosh & Company, Ltd., indiarubber and tire manufacturers, of Manchester, during the first year of the war have contributed £2,239 to various relief funds. To that total the company added an equal sum, bringing the aggregate to £4,478.

Electrical Extensions.—A further extension of the temporary electric generating station at Nechells is recommended by Birmingham Electric Supply Committee at an estimated cost of £100 000. Manchester Corporation have received the sanction of the Local Government Board to the purchase of land at Barton for the erection of electricity works.

Luminous Painting of Stop Indicators.—The Metropolitan Electric Tramways Company are unable to carry out a suggestion by Tottenham Council that cars should stop at all "request" stopping places, as the service would be delayed. Owing to enlistment more cars cannot be put on, but luminous paint will be used to make the standards at stopping places more conspicuous.

Pedestrians Invisible to Motormen.—At an inquest held at Newcastle on a miner who was fatally injured by a tramcar at night, the Coroner pointed out that while a pedestrian could see a tramcar, it was impossible for a driver to see the pedestrian, and it therefore devolved upon the public to look about them before crossing the road.

Ministry of Munitions and Electricity Works.—Coventry Council have been informed by the Ministry of Munitions that at present it is impossible to comply with their request that the electricity works should be declared a controlled establishment under the Munitions of War Act. The reason given is that the industry was not one that was included in the definition of munitions work contained in section 3 of the Act.

Employees' Applications.—Leeds General Purposes Committee have refused the application of the Corporation employees to alter the scale of wages on the war bonus, but are prepared to do all they can to give opportunities for working overtime, for which pay will be at the rate of time and a half. As compensation for the strain imposed upon them in driving in the dark, Sunderland Corporation motormen have asked for extra pay when engaged during darkness.

Erith-Bexley Through Running.—At the request of the manager of Bexley Tramways, the Erith Tramways department have agreed to undertake the entire operation of the section between Northumberland Heath and Bexley Market Place, as the existing arrangements

Digitized by Google

were not satisfactory from a traffic aspect. Terms have been agreed upon for the hire by Erith Council of two additional cars from the London United Tramways Company.

Parcels Traffic at Ilford.—On January 1 Ilford Tramways department introduced a charge of one penny for packages or folding carriages carried on the cars. No charge will be made for personal luggage up to 28 lbs. in weight, or for small packages that can be conveniently carried on the lap of a passenger. The following articles will not be carried: Bags of coal, soot, flour, and manure, butcher's meat and fish (unless in baskets and covered in), open cans or pails of liquid in any form, sweeps' brushes, and bicycles.

British Electrical Manufacturers and Russia.—The Electrical Manufacturers' Company of Great Britain, Ltd., has been registered, with a nominal capital of £12,000, in £1 shares, to carry on business in Russia and elsewhere. The promoters are Messrs Bruce Peebles & Co., Crompton & Co., the Lancashire Dynamo & Motor Co., Allen West & Co., Brook, Hirst & Co., Eckstein, Heap & Co., and Whipp & Bourne. The first directors are Messrs. J. H. Bunting, E. R. Reeves, H. C. Siddeley, W. J. Moggridge, J. A. Hirst, A. Eckstein and S. Whipp.

Power Plant at Wellington.—The electrical engineers of the tramways and lighting departments at Wellington, New Zealand, have been directed to report on the advisability of installing additional generators, and whether a new building should be erected capable of housing the whole of the machinery for both departments. In the annual report of the tramways department the general manager suggests that consideration should be given to the possibility of a hydro-electric system being adopted.

Shortage of Railway Wagons.—Leeds Chamber of Commerce on January 5 received a letter from the Railway Clearing House, suggesting that the temporary shortage in railway wagons for trade purposes was mainly due to the failure of traders to regulate the forwarding of traffic and the delay by consignees in unloading wagons. The President (Mr. F. J. Kitson) said the number of wagons available was not sufficient for moving the goods of the country, and this was partly due to the large number of wagons awaiting repairs.

Crowded Off by Soldiers.—Owing to complaints that soldiers paying half fares have crowded other users off the cars, a recommendation was made by Northampton Tramways Committee that the reduced fares should no longer be granted. The Council, however, have referred the matter back for reconsideration, more especially in the interest of wounded soldiers. There need be no anxiety for the latter if a regulation be made that such tickets be issued only to men in hospital uniform. It is now becoming a general rule to charge full fares to soldiers in training, exceptions being made in some towns for orderlies.

Reduced Speed at Hull.—After considering the views advanced by a deputation, who asked for an effort to be made to secure better lighting, the Lord Mayor of Hull, the deputy-chairman of the Tramways Committee, and the general manager, have decided that the safest course to pursue, especially during the very dark nights, would be to reduce the speed of the cars. That course has now been taken, and at the end of December, Alderman J. H. Hargreaves, the Lord Mayor, stated that the result was very satisfactory. The blue paint has been removed from the car windows, the manager having experimented until discovering a suitable substitute in dark amber colour.

Construction Work Delayed.—York Tramways manager has reported that difficulty is being experienced in obtaining standards for erection on the new Hull Road route. At the end of December the Haxby Road extension had been so far completed that the Tramways Committee applied to the Board of Trade for their consent to the running of cars.—Further delay to the completion of the Doncaster tramways extension to Brodsworth colliery district was occasioned by the gales that marked the opening of the New Year. The men employed by the Post Office to remove their poles and wires to make room for the tramway were called away for repair work elsewhere.

Charge for Traction Power at Torquay.—The Electricity Committee have advised the Corporation to adhere to the terms of the agreement with the Tramways Company, under which they contend that the company should be asked to pay an additional charge of ¼d. per unit for power. It is stated that under the terms of the agreement the company were charged 1¼d. per unit with the understanding that if the price of coal increased beyond £1 per ton there should be an advance, and if an agreement could not be arrived at, the question should be taken to arbitration. The Council are now paying £1 7s. per ton. The company's consumption amounts to 800,000 units per annum.

Non-Inflammable Railway Carriages.—In answer to a question in the House of Commons relating to deaths caused by carriages catching fire in a recent railway accident, the President of the Board of Trade stated that some of the principal railway companies were understood to be carrying out the recommendation that coaches should be constructed of steel as far as possible, and that any timber used should be rendered non-inflammable. On the Underground electric railways, on which the rolling-stock must be of a type approved by the Board of Trade, the woodwork of the cars had to be non-inflammable. The Board of Trade had no power as regarded ordinary railways to make an order declaring it obligatory that all new railway carriages shall be of non-inflammable material.

To Prevent Congestion at a Terminus.—Portsmouth Tramways Committee are about to present to the Corporation a plan for preventing the congestion and danger that occurs at the Cosham terminus during the summer and on holidays. Messrs. W. R. Spaven (general manager) and V. G. Lironi (electrical and permanent way engineer) have prepared a scheme for converting the dead end into a circular line. The main stopping-place will be at the west corner of a plot of ground that is proposed to be purchased. The cars would continue round the loop to the opposite side, where covered queues are to be constructed. These gangways will lead to a series of lines from which cars will start on the return journey. Provision is made for illuminating the queues and the destination signs at night.

Adelaide and Launceston Tramways Labour Dispute.—In the Arbitration Court at Melbourne the Adelaide Municipal Tramways Trust, Launceston Municipal Council, and the tramway employees have registered agreements arrived at in connection with the demand of the men for increased wages and better conditions of labour. The agreements are to extend over three years. The rates to be paid are to continue until the revenues of the respective Corporations are more than sufficient to meet obligations, and a conference is to be held in August each year between representatives of each party to review the financial position and fix such wages as are considered justifiable. A Board is provided to deal with any disputes that may arise. It is also agreed that employees must within one month of joining the service become members of the Tramway Employees' Association.

PERSONAL.

Captain C. C. Vesey, D.L., vice-chairman of Dublin and Lucan Electric Railway, and a director of Dublin United Tramways Company, died during Christmas week.

Mr. T. H. B. Heslop, founder of the County Surveyors' Society, and for 30 years county surveyor of Norfolk, has died at Edgewood, Eaton.

Mr. J. E. M. Stewart, chief assistant engineer, Leicester electricity department has resigned in consequence of ill-health. The engineer has been authorised to endeavour to obtain the services of an assistant engineer at a salary of £300 per annum.

Mr. K. P. Hawkesley joined the board of the National Steam Car Company during the past year. The appointment was confirmed by the shareholders at the annual meeting on December 30, when Mr. F. Clarkson was re-elected managing director.

Mr. J. S. Brodie, borough engineer at Blackpool, is to succeed Mr. T. H. Wakelam, county engineer for Middlesbrough, as President of the Institution of Municipal and County Engineers. The annual meeting will be held at Blackpool in June next.

Mr. R. A. Brown, chief assistant at Falkirk electricity works, has been appointed burgh electrical engineer to fill a vacancy caused by the resignation of Mr. H. Ranson, who has joined the Forces. Mr. Brown was formerly with Glasgow Corporation Tramways.

Mr. A. H. Preece, of Messrs. Preece, Cardew, Snell & Rider, of London, arrived at Shanghai early in December for the purpose of advising the Municipal Council as to the extension of the electricity undertaking.

Mr. A. E. McKenzie, chief assistant engineer, Manchester Electricity Department, has been recommended by the Electricity Committee for promotion to the post of deputy chief engineer, at a salary of £700 per annum, with annual increments of £50 until £800 is reached.

Sir William Middlebrook, M.P. for South Leeds, one of the New Year Knights, was on January 5 the subject of a congratulatory resolution from Leeds Corporation. The Lord Mayor mentioned, among other matters, the new knight's work as chairman of the Local Legislation Committee of the House of Commons.

Mr. J. E. Acfield, chief assistant in the office of Leeds city engineer, has received a commission in the Royal Engineers. At the outbreak of the war there were 39 men in the office eligible for enlistment. Twenty-five are now serving with the Forces, nine have attested under the Derby scheme, and four have been rejected.

Lieutenant S. W. Carty, late assistant electrical engineer of the Liverpool Corporation Tramways, who for some time past has been officer to a divisional ammunition park in England, is again proceeding to the Front. Mr. Carty obtained a commission in December, 1914, and was appointed workshop officer to the Anti-Aircraft Section, British Expeditionary Force, France. He was subsequently appointed workshop officer to the transport at one of the bases.

Mr. E. Lafferty's departure from Preston Tramways in order to take up the duties of traffic superintendent to Edinburgh Tramways Company, was referred to by Ald. J. Ormrod, chairman of the Tramways Committee, at the December meeting of the Council. The alderman remarked that they parted with Mr. Lafferty with considerable regret. He had done very well for them, and had risen from the lowest position.

Dr. F. S. Pearson, of Great Barrington, Massachusetts, U.S.A. and London, head of the Brazilian Traction Light and Power Company, Barcelona Traction Light and Power Company, Mexico Tramways Company, and other undertakings in Mexico, who was drowned in the "Lusitania" on May 7, has left property in this country of the value of £328,960. Among the bequests is a capital sum producing 2,500 dols. a year in trust to pay 150 dols. a year to not more than twenty-four boys in college for educational purposes.

Mr. J. Dalrymple, general manager, Glasgow Corporation Tramways, has been agreed upon by Sheffield and Rotherham Tramways Committees as the arbitrator to decide the question of running additional cars for munition workers between the Hadfield works and Tinsley terminus. The award will be for the period of the war, and the tramways managers of the respective Corporations are to be the only persons to appear before the arbitrator. Each party will pay their own costs.

Digitized by Google

A New Year Knight.—Mr. George Franklin, of Sheffield, is one of the recipients of knighthoods bestowed by the King on the occasion of the New Year. Sir George is head of a firm of chartered accountants, of Sheffield and London. He is Pro-Chancellor of Sheffield University, a director of Lanarkshire Tramways Company, British Thomson-Houston Company, and several telephone companies abroad, including Constantinople. He was also chairman of the late National Telephone Company. In 1897-8 he was Lord Mayor of Sheffield, and he has for many years worked for the improvement of education facilities.

Colonel Lord Montagu of Beaulieu joined the torpedoed P. and O. liner *Persia* at Marseilles, for conveyance to Bombay, in order to take up a new appointment as inspector of mechanical transport vehicles. As his name did not appear in the first list of passengers saved, fears were expressed that he was one of the victims of the piratical and murderous enemy, but on January 4 news arrived that he had reached Malta. Lord Montagu drove the first motor-car into Palace Yard, and also gave King Edward his first motor drive. He made an unsuccessful attempt in the House of Lords to upset the resolve of both Houses to impose a road charge on omnibuses using the projected new western outlet from London.

Mr. C. N. Hefford, electrical engineer and manager, Leeds electricity department, on January 5, by 35 votes to 19, was accorded an increase of salary from £600 to £800 per annum. Councillor Lupton, in proposing the increase, stated that Mr. Hefford's predecessor, Mr. Dickinson, was receiving £900 when his services were acquired by Liverpool at £1,000, which had since been increased to £1,500. A year ago Mr. Hefford carried out work for the extension which, if done by a consultant, would have entailed an outlay of 5 per cent., or roughly £120,000. While Leeds was sixth on the list of cities and towns in the United Kingdom in the output of current, and third in cheapness of cost, it was twentieth in respect of the salary of the engineer.

CONTRACTS AND ORDERS.

British Westinghouse Company are supplying and erecting a 500 kw. rotary converter set to Salford Council, at £1,450.

Manchester Tramways Committee have accepted the tender of H. Seddon & Son, Ltd., for the supply of salt for street purposes.

Albion Motor Car Company, Ltd., have received a contract from Salford Electricity Committee to supply and deliver a four-ton Albion petrol motor wagon, at £775.

Dennis Bros. (Ltd.) tender to supply a motor fire-engine to Frith Council, at £875, with a ladder attached, at a cost not exceeding £20, has been recommended for acceptance.

Liverpool Tramways and Electricity Committee have accepted the tender of the British Transformer Company, Ltd., for the supply of static transformers.

Messrs. Burt & Timms have obtained a contract for the construction of permanent way for the Melbourne, Brunswick and Coburg Tramways Trust, at £27,863.

Sydney Council have placed contracts as subjoined :—N. Gutheridge, 2,000 kw. Bruce-Peebles motor converter, £8,737; Babcock & Wilcox, Ltd., extension of suction ash handling plant.

British Insulated and Helsby Cables, Ltd., have been awarded a contract to supply, deliver, and erect an overhead line for Nuneaton Electricity Committee, at £436 11s. It is to be of copper, all aluminium having been withdrawn from the market.

Salford Tramways Committee have accepted the following tenders: Brown Bayley's Steelworks, Ltd., supply and delivery of 300 steel tramcar tires; Hadfields, Ltd., supply and delivery of 14 manganese steel crossings.

Keighley Tramways Committee have recommended an extension of the railless trolley car undertaking from the terminus at Hebden Road, Haworth, to Lower Town, Oxenhope, and that the offer of Clough, Smith & Co., Ltd., be accepted for the construction of the overhead equipment. It is proposed to suspend the capital payment until after the end of the war.

Manchester Electricity Committee have allotted tenders as follows: Musgrave and Co., Ltd., set of induced-draught plant; Worthington Pump Co., Ltd., steam turbine-driven boiler feed pump; Mather and Platt, Ltd., two electrically-driven circulating water pumps; Babcock and Wilcox, Ltd., London, coal-conveying plant; Klein Engineering Co., Ltd., water cooler; Marple and Gillott, Ltd., railway track and crossing; F. Morton and Co., Ltd., steelwork, etc., required in boiler house No. 3; F. Mitchell and Co., Ltd., foundations for new cooling towers and boiler house.

Birmingham Electric Supply Committee have placed the following contracts: J. J. Shardlow, foundations, engine and boiler house, £2,500; E. C. and J. Keay, Ltd., structural steelwork, £5,800; Babcock and Wilcox, Ltd., three boilers, with superheaters, chain grate stokers, chimneys, induced draught fans, etc., £17,000; Herbert Morris, Ltd., coal-handling plant, overhead telpherage system, £3,500; Davenport Engineering Company, cooling towers, including foundations, £5,550. The work is in connection with the extension of the temporary generating station at Nechalls.

FINANCIAL REPORTS AND MEETINGS.

Douglas Southern Electric Tramways.—The 20th annual report shows a deficit of £1,188 on the season's working—due to the effects of the war. The directors do not see any probability of the next season being a profitable one. In 1914, with a season of 126 days, the traffic receipts were £3,840, as against £6,492 in 1913. For 1914 a dividend of 1½ per cent. was paid on the 7 per cent. preference shares, with £317 forward. In 1913 the ordinary shares got 3¼ per cent. after meeting the full preference dividends.

Christmas Holiday Traffic.—At Manchester the tramways receipts for Christmas Eve, Christmas Day, and Boxing Day, totalled £7,907, as against £7,466 for 1914, and £7,541 for 1913. At Salford the receipts from December 24 to 27 inclusive were £2,934, as compared with £2,619 the previous year. Dublin United Tramways Company's receipts for the four days of Christmas were £3,593. In 1914 the amount was £3,317. The number of passengers carried was 683,762, while for the 1914 holiday the total was 633,597.

Belfast General Manager's Estimate.—The Corporation Tramways for the eight months ended November 30 showed a gross profit of £82,865, a net profit of £41,645, and a surplus of £9,511, after paying sinking fund and depreciation. For the full financial year Mr. A. Nance, the general manager, has estimated a surplus of £8,000 after paying in full everything specified by the Aberdeen clause of the Tramways Act. With a continuance of the present traffics it is hoped that there will be a surplus of £12,000, despite a charge of over £10,000 for half pay to enlisted employees and a war bonus to the others. Another extra charge is the enhanced price of coal, which will entail an expense of about £7,500. It has increased the cost of power by 50 per cent. In the early part of the year the City Treasurer estimated that there would be a deficiency of £5,500 on the undertaking. In accordance with the Aberdeen clause, the Tramways Committee therefore increased the fare on the pleasure route to Glengormley by a penny. Again acting on the Aberdeen clause, the Council in September reduced several of the services, although Mr. Nance had reported against the proposal. Two months' experience led to the abandonment of the 20 minutes' services, and the re-establishment of the minimum 10 minutes' service all over the city.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended December 25, give total receipts of £182,295, or £12,530 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £79 10s. 8d. per mile of single track, and last year at the rate of £74 18s. 4d., thus showing an increase for the past week of £4 12s. 4d. per mile open. The principal London tramways have temporarily discontinued the publication of traffic returns.

BUSINESS NOTES.

Thermit, Ltd., engineers and contractors, 27, Martin's Lane, E.C., have issued their pocket diary for 1916. It contains full information with reference to tramway rail welding, together with an announcement that, owing to the curtailment of expenditure by tramway undertakings, due to the war, the number of joints welded during the past twelve months has fallen off considerably. Contracts have, however, been carried out at several places where permission had been granted by the Treasury.

"Underground" Map of Theatreland.—In 1914 the Underground Railways issued a pictorial map of London in old style, in which the names of the various streets and buildings were treated in a fantastic manner by taking the literal meaning of the name of the place, or some association. The same designer, MacDonald Gill, has prepared a second map in the same manner, taking Theatreland as his subject, and it may now be seen on the various undergound stations. The usefulness of the map at the present season is brought home by a bill in bright harlequin colours, which forms a companion. On the central black panel of this design are set forth the merits of the Underground as a "scene-shifter from home to the lands behind the curtain."

The Edison and Swan United Electric Light Company, Ltd., Ponders End, Middlesex, have issued two new publications dealing with their drawn wire filament lamps and the new "pointolite" lamps for projection lanterns. An addition to these Royal Ediswan lamps is the "downlight" or reflector lamp. It is made with a separate reflector, which is easily attached and secured by an adjustable sleeve, making it a perfect fit, so that the lamps can be used at any angle. The advantage of the separate reflector is that lamp renewals are less costly.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Jan. 7	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	63½	63¾
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	87½xd	78/6xd
4%	4%	Do. 4% Deb. ...	100	91	72½xd	74xd
4½%	4½%	Do. 4½% Deb. ...	100	98½	77½xd	77½xd
5%	5%	Do. 5% Deb. ...	100	96	80	80½
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1 5/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94¾xd	94¾xd
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10 1/16	10 1/16
4½%	4½%	Do. 4½% Deb....	100	96	87½xd	87½xd
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98xd	98
$½	$½	Brazilian Trac. & Power Ord....	$100	66	51⅛	51¼
$1½	$1½	Do. 6% Cum. Pref.	$100	97	91	91¼
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6¾	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	89½xd	92½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	36	40
6%	5%	Do. Pref. Ord....	100	106	40	41
5%	5%	Do. 5% Cum. Pref.	100	103	60	60
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	62½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75	75
70/-	70/-*	Do. 7% Pref.	100	55½	46½	46
—	—	Do. 6% Pref. Ord.	100	17½	15½	15
—	—	Do. Def. Ord.	100	11	8¼	8¼
5%	5%	Do. 5% Deb.	100	92	81½	80
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87	87
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	5⅞	5⅞
1/3	1/3	City of B.A. Trams.	5	5½	93/1½	93/1½
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85½xd	85½
5/-	5/-	Dublin United Tramways ...	10	—	£10 1 6	£10 1 6
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	77½	77½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	9/15/6	9/15/6
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	86½xd	86½
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	15/64	2/4	2/4
6d.	6d.	Do. 5% Pref.	1	9/16	9/6	9/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	58¾xd	58¾xd
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	91½xd	91½xd
5%	5%	Do. 5% Inc. Deb.	100	88½	84½	84
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51xd	51xd
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	105	105½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	69xd	69
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	73¾	73¾
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	82½xd	82½xd
$1¾	$1¾	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	48¾	48½
6%	6%	Do. 6% Mt. Bds.	100	76	43½	44½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94¼	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	93½	93½
1/2½*	1/-*	National Steam Car	1	15/32	13/6	13/-
9⅜d.*	9⅜d.*	New General Traction	1	½	7/9	7/9
1/2½	6d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	67/6	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	13/32	10/-	10/-
10d.	8d.	Provincial Trams. Ord.	1	¼	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	88⅜xd	91⅞
5%	5%	1st. Mt. 5% 50 yr.	100	89½	78	77¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90	90
5%	5%	Do. 5% Perp. Deb.	100	99½	81	82
—	—	Singapore Elec. Trams	5/-	¼	2/9¾	2/9¾
5%	5%	S. Elec. Trams. of B. A. 5% ' 1st. M.D....	—	100½	94xd	94
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	86	86
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	7/7½
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	86/3	88/-

* Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914	Latest Return. 1915	Aggregate. Wks.	Aggregate. 1914-5.	Aggregate. Increase or Dec.
Anglo-Argentine.....	Dec. 31	£58,098	£60,549	52	£2,667,728	—£131,099
Auckland.....(28 days)	Dec. 17	20,414	21,804	24	125,840	+ 908
Ballarat and Bendigo ...	Oct. 10	3,313	3,402	28	21,511	— 2,421
Brazilian Traction Mlrs.	Nov.	5,929,730	6,336,000	48	70,586,110	+3,245,122
Brisbane	Nov.	28,600	31,120	48	338,074	+ 20,853
British Columbia.....$	Nov.	648,485	562,782	22	2,636,479	— 688,357
Buenos Aires Lacroze ...	Dec. 6	44,000	43,528	26	250,930	— 1,836
Burmah Tramway ... Rs.	Jan. 1	3,051	3,222	...	78,185	+ 6,750
Calcutta.....Rs.	„ 1	60,748	66,731	52	3,428,227	+ 5,983
Cape Town	Nov.	...	13,870	...	...	...
Carthagena & Herrerias..	Dec.	1,255	2,129	52	21,968	— 3,354
Cordoba	Nov.	12,468	13,785	30	111,123	+ 3,784
East India	Dec.	1,839	2,062	22	10,516	+ 549
Hong Kong .....$	Nov. 27	8,984	10,701	48	527,275	— 10,481
Kalgoorlie	Oct.	2,525	2,675	44	27,791	+ 1,286
La Plata	Dec.	4,452	4,564	52	51,400	— 3,984
Lima	Nov.	29,712	30,703	48	351,169	— 9,612
Lisbon .....Escu.	Nov.	...	170,130	...	...	...
Madras (14 days).....Rs.	Dec. 31	31,416	36,150	50	708,977	+ 42,356
Manila .....$	Nov.	129,000	129,447	48	1,353,983	— 116,711
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne.....	Sept.	...	61,211	...	...	...
Mexico .....$	*	...	...	...	...	...
Montevideo.....	Dec	28,605	31,305	8	59,712	+ 4,026
Port Elizabeth	Nov.	...	3,110	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Dec.	4,492	4,459	52	57,735	— 1,786
Shanghai .....$	Nov. 24	25,200	27,529	...	...	...
Singapore .....$	Dec. 4	10,042	12,756	...	556,874	+ 10,997
Toronto.....$	Nov.	824,634	851,113	48	8,793,719	— 502,658
Winnipeg	Nov.	330,398	323,025	48	3,122,620	— 610,281

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1914-15	Latest Return. 1915-16	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Incr. or Dec.
Aberdeen Corporation...	Dec. 29	£1,588	£1,902	+ £314	30	£54,645	+ £3,211
Accrington Corp.....	„ 22	504	551	+ 47	38	21,132	+ 545
Ayr Corporation	Jan. 1	248	269	+ 21	33	13,057	+ 732
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 2	1,263	1,432	+ 169	39½	54,636	+ 4,452
Birmingham Corp.	„ 1	12,931	15,986	+ 3,055	40	566,490	+ 81,504
Blackburn Corp.	Dec. 29	1,281	1,232	— 49	39⅔	50,800	— 289
Blackpool & Fleetwood.	Jan. 1	431	414	— 17	52	38,964	— 320
Blackpool Corp.	Dec. 30	831	891	+ 60	40	68,986	+ 1,874
Bolton Corporation.....	Jan. 1	3,170	3,040	— 130	40	107,048	— 1,673
Bournemouth Corp.....	„ 5	1,859	1,998	+ 139	40	85,752	+ 4,014
Bradford Corporation ...	Dec. 25	6,258	6,045	— 213	38	251,258	+ 10,165
Brighton Corporation ...	Jan. 2	881	990	+ 109	39⅓	44,899	+ 488
Bristol	Dec. 31	10,125	13,134	+ 3,009	52	506,928	+ 56,722
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	Jan. 1	1,483	1,779	+ 296	40	63,830	+ 1,695
Burton-on-Trent Corp...	„ 1	311	365	+ 54	40	11,378	— 349
Bury Corporation.....	„ 2	1,275	1,368	+ 93	39⅓	53,893	— 297
Cardiff Corporation.....	Dec. 25	2,676	2,768	+ 92	38	104,120	— 2,478
Chatham & District.....	„ 31	969	1,301	+ 332	52	60,357	+ 9,918
Chesterfield Corp.	„ 30	260	316	+ 56	39	10,654	+ 31
Colne Corporation	„ 18	211	225	+ 14	...	...	...
Cork Electric	„ 31	414	568	+ 154	52	26,025	+ 144
Croydon Corporation ...	„ 24	1,876	2,009	+ 133	38	70,859	+ 4,437
Derby Corporation	Jan 1	1,060	1,244	+ 184	39⅔	41,750	+ 1,470
Dover Corporation	Dec. 25	238	256	+ 18	38	12,115	+ 2,142
Dublin & Lucan	„ 31	283	276	— 7	26	3,868	+ 59
Dublin United	„ 24	6,375	6,938	+ 563	51	311,437	+ 11,072
Dundee City	„ 29	1,265	1,399	+ 134	32⅓	44,522	+ 2,431
East Ham Corporation	Jan. 1	1,176	1,309	+ 133	39⅔	51,629	+ 5,527
Exeter Corporation.....	Dec. 31	378	324	— 54	39	14,971	+ 792
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	Jan. 1	21,857	22,784	+ 947	31	669,114	+ 42,711
Glasgow Subway.....	Dec. 31	954	1,027	+ 73	52	56,060	+ 2,273
Glossop (U. Elec. Supp.)	Jan. 1	112	144	+ 32	1	144	+ 32
Halifax Corporation.....	Dec. 28	2,383	2,181	— 202	38	87,281	+ 705
Hastings & District.....	„ 31	956	1,064	+ 108	52	70,347	— 92
Huddersfield Corp.	Jan. 1	2,474	2,642	+ 168	39	105,883	+ 14,509
Hull Corporation.....	„ 1	3,267	3,421	+ 154	39	121,743	— 2,148
Ilford U.D.C.	„ 1	695	686	— 9	39	25,690	+ 2,939
Ilkeston Corporation ...	„ 5	108	129	+ 21	40	5,399	+ 234
Ipswich Corporation	„ 1	434	548	+ 114	38	21,812	+ 3,520
Isle of Thanet	„ 1	289	292	+ 3	13	3,451	— 965
Kilmarnock Corp.	„ 1	204	197	— 7	33	5,587	+ 164
Lanarkshire	„ 1	1,826	2,973	+ 647	52	103,421	+ 6,714
Lancashire United	Dec. 29	1,661	1,805	— 144	52	89,680	+ 5,399
Leeds City.....	Jan. 1	8,491	9,515	+ 1'024	40	355,476	+ 27,149
Leicester Corporation ...	„ 1	3,146	3,651	+ 505	1	3,651	+ 505
Leith Corporation	„ 1	723	821	+ 98	33	25,468	+ 1,675
Leyton U.D.C.....	Dec. 30	1,454	1,589	+ 135	39	63,578	+ 9,255
Liverpool Corporation...	Jan. 1	12,936	13,896	+ 960	1	13,896	+ 960
Llandudno & Colwyn B.	Dec. 31	199	189	— 10	4½	817	+ 30
London County Council	Sept. 22	41,976	46,960	+ 4,984	25	1,095,822	— 4,285
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	Jan. 1	178	154	— 24	12½	1,700	— 689
Maidstone Corporation..	Dec. 23	206	204	— 2	38	8,446	+ 254
Manchester Corp.....	Jan. 1	17,161	17,447	+ 286	39	706,736	+ 22,518
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	„ 1	152	223	+ 71	39½	7,750	+ 367
N'castle-on-Tyne Corp.	„ 1	5,977	5,424	— 553	39	247,178	+ 27,354
Newport (Mon.) Corp....	„ 1	803	967	+ 164	40	33,402	+ 895
New St. Helens & Dist.	Dec. 29	954	1,097	+ 143	26	27,346	+ 2,779
Northampton Corp.....	„ 31	659	686	+ 27	39⅔	28,717	+ 4,945
Nottingham Corp.....	„ 30	2,962	3,745	+ 783	39	146,681	+ 10,843
Oldham Corporation ...	Jan. 2	2,068	2,282	+ 214	41	92,993	+ 3,854
Portsmouth Corp.....	„ 1	2,155	2,285	+ 130	40	99,233	...
Preston Corporation.....	Dec. 29	834	1,023	+ 189	39	38,027	+ 1,665
Provincial	Jan. 1	1,974	2,257	+ 283	13½	27,381	+ 1,713
Reading Corporation.....	Dec. 30	679	873	+ 194	39½	31,234	+ 3,373
Rhondda Tramways.....	„ 23	1,110	1,201	+ 91	51	60,238	— 1,942
Rochdale Corporation...	Jan. 1	1,539	1,747	+ 208	38½	67,616	+ 3,040
Rotherham Corp.....	„ 5	1,003	1,298	+ 295	40	47,175	+ 5,740
Salford Corporation.....	„ 3	5,041	5,287	+ 246	39⅔	207,074	+ 8,182
Sheffield Corporation....	„ 2	8,398	9,446	+ 1,048	40½	363,693	+ 49,004
Southampton Corp.....	Dec. 29	1,180	1,483	+ 303	39	59,133	+ 6,582
Southend-on-Sea Corp...	„ 29	601	651	+ 50	39	32,629	— 7,958
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 25	773	806	+ 33	38⅔	30,792	+ 1,230
Sunderland Corp.....	Jan, 2	1,539	1,697	+ 158	40	60,035	+ 897
Sunderland District.....	Dec. 29	633	683	+ 50	9	4,987	+ 321
Swindon Corporation ...	„ 22	192	196	+ 4	38	7,533	+ 647
Torquay Tramways.....	„ 23	388	410	+ 22	51	27,471	— 398
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	„ 29	567	545	— 22	26	15,470	— 686
Wallasey Corporation ...	Jan. 1	1,109	1,238	+ 129	39⅔	50,966	+ 868
Walsall Corporation.....	Dec. 25	797	881	+ 84	52	38,533	+ 5,702
Walthamstow U.D.C....	Jan. 1	767	854	+ 87	40	35,769	+ 3,485
Warrington Corp.....	Dec. 30	410	513	+ 103	39	18,097	+ 939
West Ham Corporation	„ 30	2,641	3,070	+ 429	39	121,905	+ 10,522
Wigan Corporation	„ 30	1,397	1,720	+ 323	39	60,473	+ 2,830
Wolverhampton Corp....	Jan. 5	1,061	1,217	+ 156	40	45,212	+ 2,641
Yorkshire (W. Riding)...	„ 2	1,505	1,799	+ 294	1	1,799	+ 294

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

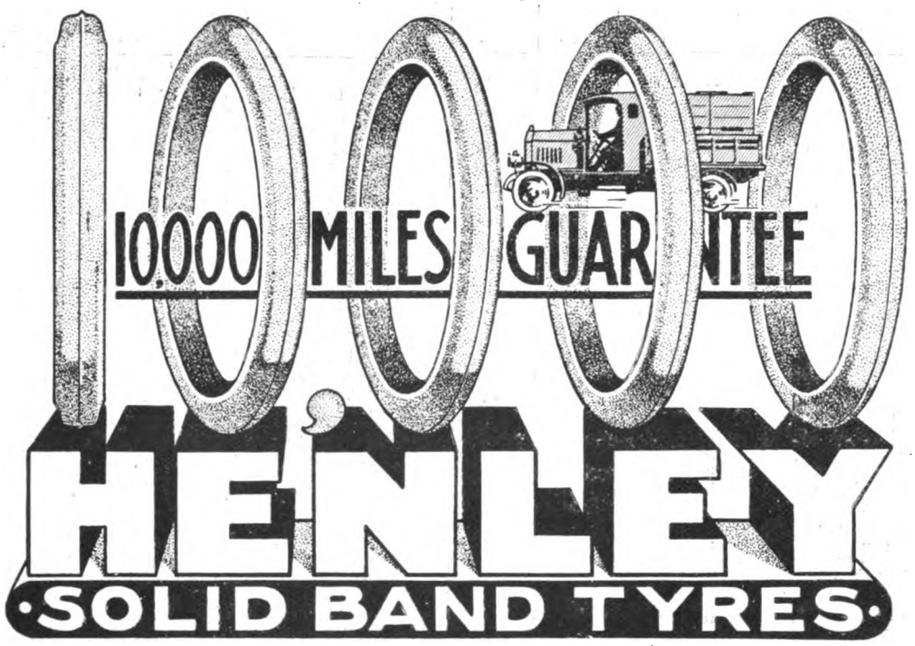
COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google



Manufacturers:

W. T. HENLEY'S TELEGRAPH WORKS CO., LTD.

Tyre Department:

18, NEW UNION STREET, MOORFIELDS, E.C.

Telephone No.: 3886 London Wall. Telegrams: "Hetewocol, Ave, London."

COMPARATIVE TRAMWAY ACCOUNTS.

The latest Municipal Tramway Accounts are summarised in

THE TRAMWAY AND RAILWAY WORLD

OF DECEMBER 9, 1915.

The capital and working reports are clearly and systematically arranged so that any required fact can be readily ascertained, while comparisons of results of the different systems can easily be made.

Particulars are given under the following heads:—

Capital Account :—
- Borrowing Powers.
- Borrowing Powers Exercised.
- Unexhausted Borrowing Powers.
- Capital Expenditure per mile of Single Track.
- Loans Outstanding.
- Sinking Fund and Loans Repaid.
- Depreciation, Renewal and Reserve Funds.

Gross Receipts:—
- Traffic.
- Other Revenue.
- Total.

Working Expenses :—
- Traffic.
- General.
- Repairs and Maintenance.
- Power.
- Total.

Gross Profit on Working.

Reductions from Gross Profit :—
- Interest.
- Sinking Fund.
- Income Tax.
- Depreciation and Renewals.
- Sundries.
- Total.

Net Surplus or Deficit.

Appropriation of Net Surplus :—
- Carried Forward.
- Reserve.
- Relief of Rates.

Percentage of Operating Expenses to Total Revenue.

Receipts per Car Mile:—
- Average Total per Car Mile.
- Average Traffic Total per Car Mile.

Operating Expenses per Car Mile :—
- Traffic.
- General.
- Repairs and Maintenance.
- Power.
- Total.

Average Operating Expenses per Car Mile (excluding Power Cost).

Energy Consumption :—
- No. of B. of T. Units used.
- Cost per Unit.
- Units used per Car Mile.

Traffic Records :—
- Population served.
- Car Mileage.
- Passengers Carried.
- Passengers Carried per Car Mile.
- Average Fare per passenger.
- Average Journeys per head of population served per annum.
- Average Car Miles per day per Car.
- Traffic Revenue per Mile of Single Track.
- Average Traffic Revenue per annum per head of population served.
- Operating expenses per passenger.
- Average distance of 1d. fare.
- Average fare charged per mile.
- Average speed per hour.
- Average Car hours per day.
- Average number of Cars in use daily.
- Number of Cars in stock.

Digitized by Google

THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, JANUARY 13, 1916. VOL. XXXIX.

LANCASHIRE AND YORKSHIRE RAILWAY ELECTRIFICATION.

MANCHESTER TO BURY SECTION EQUIPPED WITH DIRECT-CURRENT SYSTEM AT 1,200 VOLTS.

Marked improvements have been made from time to time by the Lancashire and Yorkshire Railway in the conveyance of passengers quickly and comfortably by the introduction of electrically-propelled trains. We are now able to publish a fully-illustrated description of the company's latest step in the electrification of their railways. About 18 months ago the directors, acting on the advice of Mr. J. A. F. Aspinall, the general manager, determined upon the electrification of that important section of the company's lines extending from Manchester to Bury, and passing through the favourite residential suburbs of Heaton Park and Prestwich. A map of this district is shown in Fig. 2.

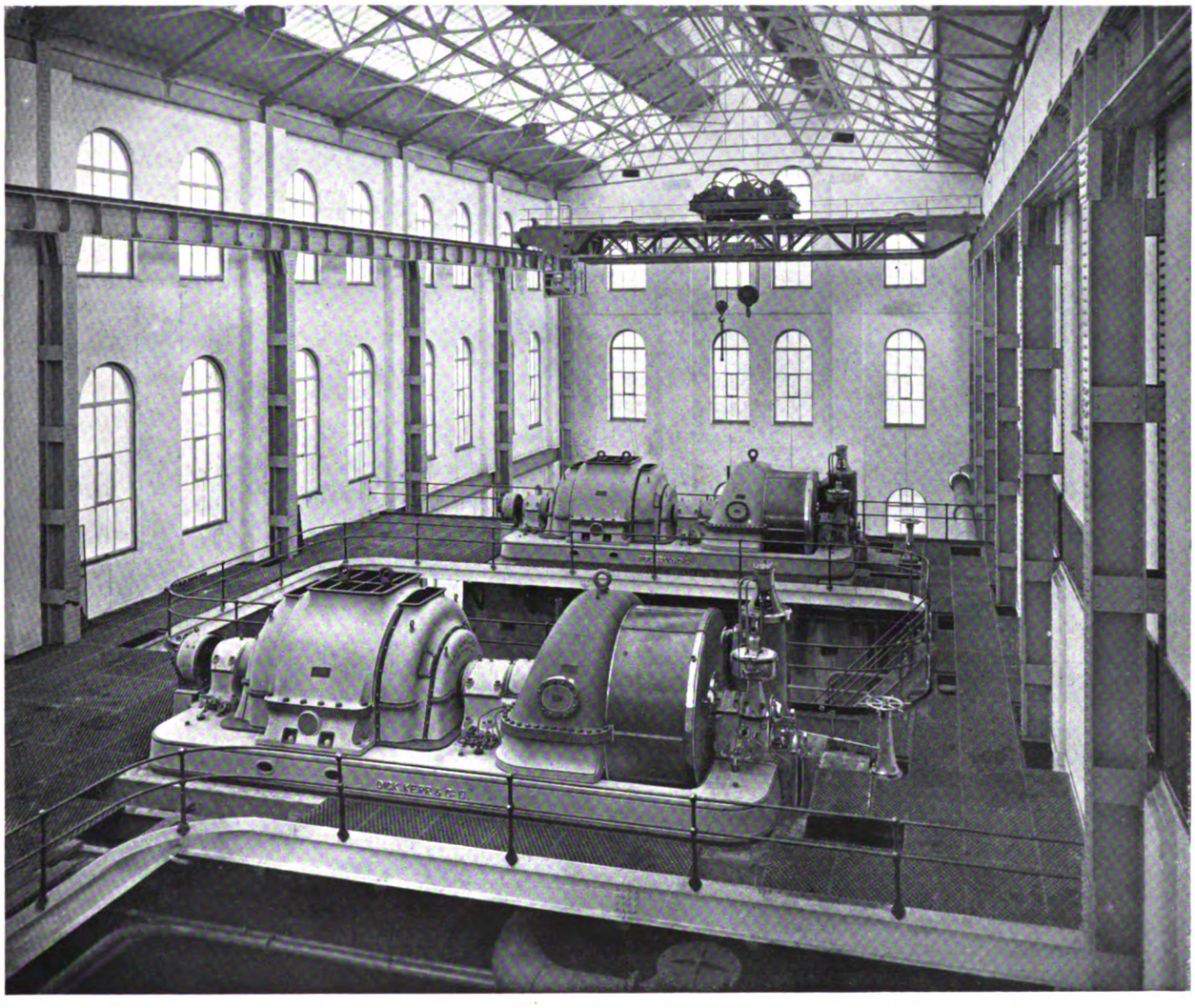


Fig. 1.—View of Engine Room, Clifton Junction Power Station, with 5,000-kw. Dick-Kerr Turbines.

Electrical working was first adopted by the Lancashire and Yorkshire Railway Company on the section between Liverpool and Southport in 1904, and the highly satisfactory results obtained have induced the company to apply electric traction with complete

Digitized by Google

confidence on what is familiarly known as the Prestwich Branch. Experience has proved that electrification of suburban railways encourages the growth of traffic, and has the additional advantages of increasing the capacity of the line and of terminal stations.

The Prestwich Branch is the first railway in the Manchester district to be converted to electric traction, and the inauguration of such a service marks an improved stage in the economic development of the city, and the evolution of rapid transit between the city and its suburbs. This district, being the second portion of the Company's system to be electrified, derives the benefit of 11 years' experience gained on the Liverpool and Southport line.

Although the live rail direct-current system, as used on the Liverpool and Southport line, is adhered to, the voltage has been raised from 600 to 1,200. The higher voltage has been adopted in consequence of the satisfactory results gained on the company's electrified line between Bury and Holcombe Brook, where direct current is used at 3,500 volts, but with overhead construction.

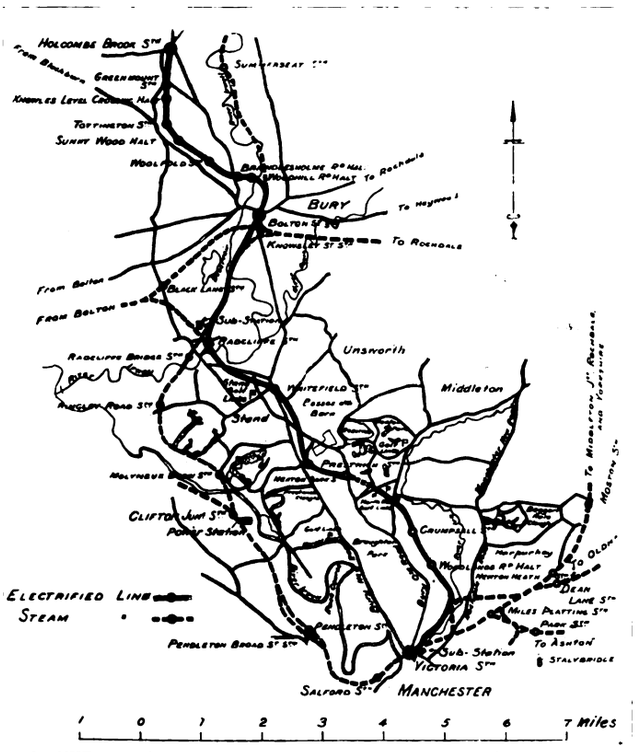


Fig. 2.—Map of Electrified Line, showing Power Station and Sub-Stations.

North Manchester's growing importance as a healthy residential district, and the ever-increasing number of people who are making their homes there, induces the belief that the new undertaking will be as conspicuously successful as its forerunner. This latter line now affords means of rapid transit for thousands of people between their homes on the Southport line and the city of Liverpool. These passengers are given what is claimed to be the fastest suburban service in the world.

Great as have been the improvements in recent years for reaching the inner suburbs of Manchester, the need for improved travelling facilities to the outer suburbs had not been fully met. The time occupied in travelling is often the measure of the distance at which the city worker can live away from his place of business, and this with the usual methods of transit means that he must live within a radius of three miles.

When the full service of electric trains is established on the North Manchester suburban line, the residential area will be increased, because the augmented and accelerated service will bring the outlying districts virtually nearer than they are to-day. Prestwich, for example, is five minutes nearer to Manchester Town Hall than it has been hitherto. The district served by the new electrification scheme, standing as it does at an average height of 300 ft. above the sea level, is becoming increasingly popular for residential purposes. The purchase of Heaton Park by the City Corporation, and the town planning schemes that are in hand, have greatly encouraged building operations in that district.

The electrification was commenced before the outbreak of war. The necessity was felt for a rapid and efficient train service, and as at that time appreciable progress had been made and all tenders placed, the directors decided that the work should be completed at the earliest possible moment.

The scheme has been carried out under the general direction of Mr. J. A. F. Aspinall, the general manager of the railway company, by his chief mechanical engineer, Mr. George Hughes, and his chief civil engineer, Mr. D. C. Rattray. All plans and specifications were prepared and contracts for all plant placed by the chief mechanical engineer's staff at Horwich, in addition to which a preponderance of the detail work, both in connection with the drawings and manufacture of material, has been carried out at the company's locomotive works at Horwich. The civil engineering portion was dealt with by the civil engineering department at Hunt's Bank, Manchester. Although progress has been considerably delayed owing to the present crisis, it is anticipated that the line will be opened for passenger traffic early in the present year.

The length of the line that is now being converted represents 22 miles of single track, but as this is only the first stage of an important electrification project for the Manchester area, it was decided to erect a new power-station of sufficient capacity in the first instance to serve the needs of present requirements and provide for considerable future extensions. In consequence of the war, the full service of electric trains will not be put into force immediately, but 27 per cent. of the existing steam trains will be replaced by electric trains, and further electric trains will be added which will augment the present service by 25 per cent.

When the full electric service is established, there will be ninety trains in each direction per day. The trains will run every twenty minutes between 5.30 a.m. and 7.30 a.m. and 7.10 p.m. and 11.30 p.m., and from 7.30 a.m. to 7.10 p.m. there will be a ten minutes' service to Radcliffe, with every other train running through to Bury, making a twenty minutes' service to the latter town.

The Power-Station.

In the design and situation of the power-station at Clifton, due regard has been paid to the four controlling factors in power-station location, namely:—

(1) It should be as near as possible to the electrical centre of the anticipated supply.
(2) It should have suitable subsoil for foundations.
(3) There should be a good and ample supply of water, and
(4) Easy facilities for the supply of coal and removal of ashes.

Clifton Junction Station, near which the power-station has been built, is a point 4¾ miles from Manchester, on the main line between Manchester and Bolton. Here the generating station occupies a position central to the Lancashire section of the Lancashire and Yorkshire Railway, and is adjacent to extensive coalfields. The foundations are everything that could be desired, and there is a good supply of water from

Digitized by Google

the Manchester, Bury and Bolton Canal, which is owned by the railway company.

As the ground level at the power-station is 37 feet below the main line, which at this point is carried on an embankment, coal wagons can be run directly over the tops of the coal bunkers. This arrangement makes use of what is obviously the best coal conveyor, namely, the coal train running between the colliery and the power-station, thus obviating the necessity of installing coal-conveying appliances. For the purpose of handling material between the two levels during the constructional period and for subsequent use, a 50-ton electric overhead travelling crane, manufactured by Messrs. T. Broadbent and Sons, Limited, of Huddersfield, has been provided.

An inspection of the block plan of the power-station and its surroundings (Fig. 3) shows the general layout of the station with regard to the railway and the canal, together with the inlet and outlet connections of the canal for the supply of cooling water. A spray cooling pond is also provided to supplement the natural cooling, which takes place from the canal itself. The slight natural flow of water along the canal is in the direction of Manchester, and the cooling water scheme makes use of this feature, the artificial cooling being brought into play when necessary.

Reference to Figs. 1, 4, 5, 6, 7, and 8 will show that the power-station structure consists of a steel skeleton filled in with brickwork. The steelwork carries the crane runways, roof, economiser floor complete with economisers, fans, and chimneys. The building is of a substantial design, in which the following objects have been kept in view :—

(*a*) Ample room around the various machinery.
(*b*) Accessibility for repairs and ease of inspection.
(*c*) Abundance of light to all parts, and
(*d*) The layout of the auxiliary machinery specially has been such as to keep everything in full view of the operating staff.

Experience gained with other electrification schemes has shown that power stations generally have not been designed with a sufficient provision for growth, which in the majority of cases has proceeded at a very rapid rate. At Clifton this contingency has been carefully provided for.

Boiler House.—The boiler house (Fig. 9) is 110 ft. long and 90 ft. wide, and is parallel with the turbine room (Fig. 1). The boiler room at present contains three Babcock and Wilcox water tube boilers, each having a normal evaporation of 32,000 lb. of water per hour, from and at 212 deg. Fahr., the steam pressure being 200 lb. per square inch gauge, superheated to 700 deg. Fahr. at the outlet. Fig. 5 shows the boilers arranged in pairs alongside each other ; each pair makes up a steam unit, and is provided with its own induced draught plant and chimney.

Chain grate mechanical stokers, of Babcock and Wilcox's latest type, are fitted to the boilers. The stokers are driven by three-phase, 440-volt motors, and are fitted with a variable speed gear box, allowing a speed variation to the grate of from 6¼ to 25 ft. per hour. The grate area of each boiler is 144 square feet ; the heating surface 7,135 square feet ; and the superheating

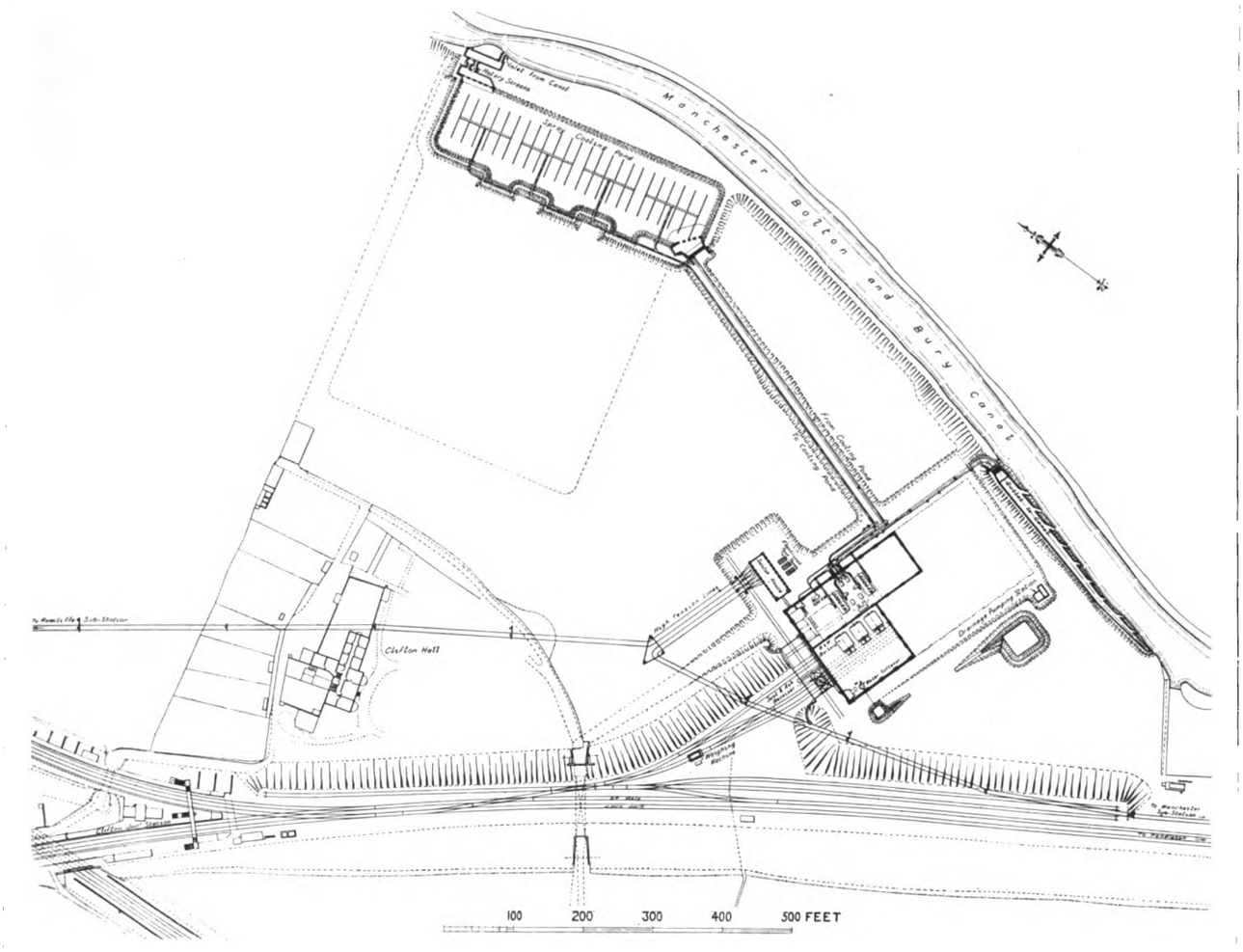


Fig. 3.—Plan of Power Station Site at Clifton Junction.

Digitized by Google

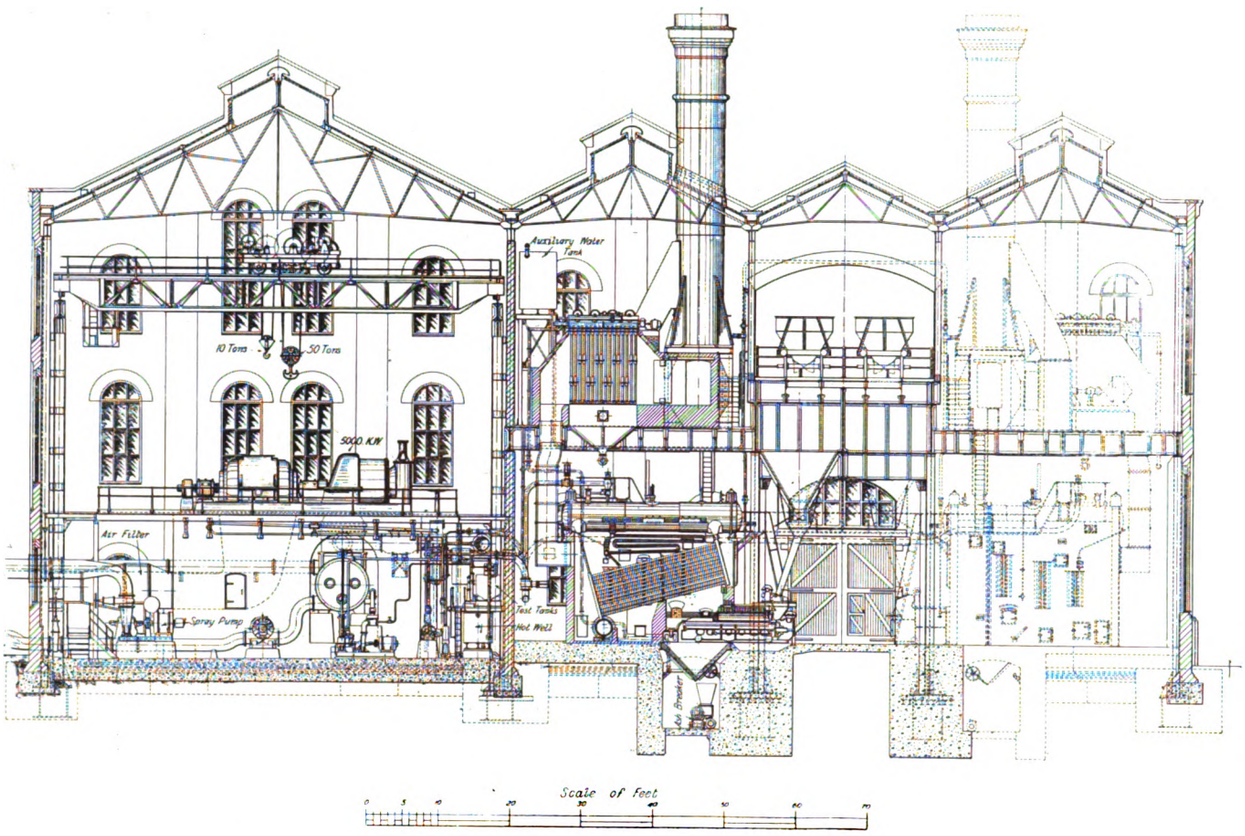


Fig. 4.—Cross Section of Power Station, showing Turbine and Boiler Rooms.

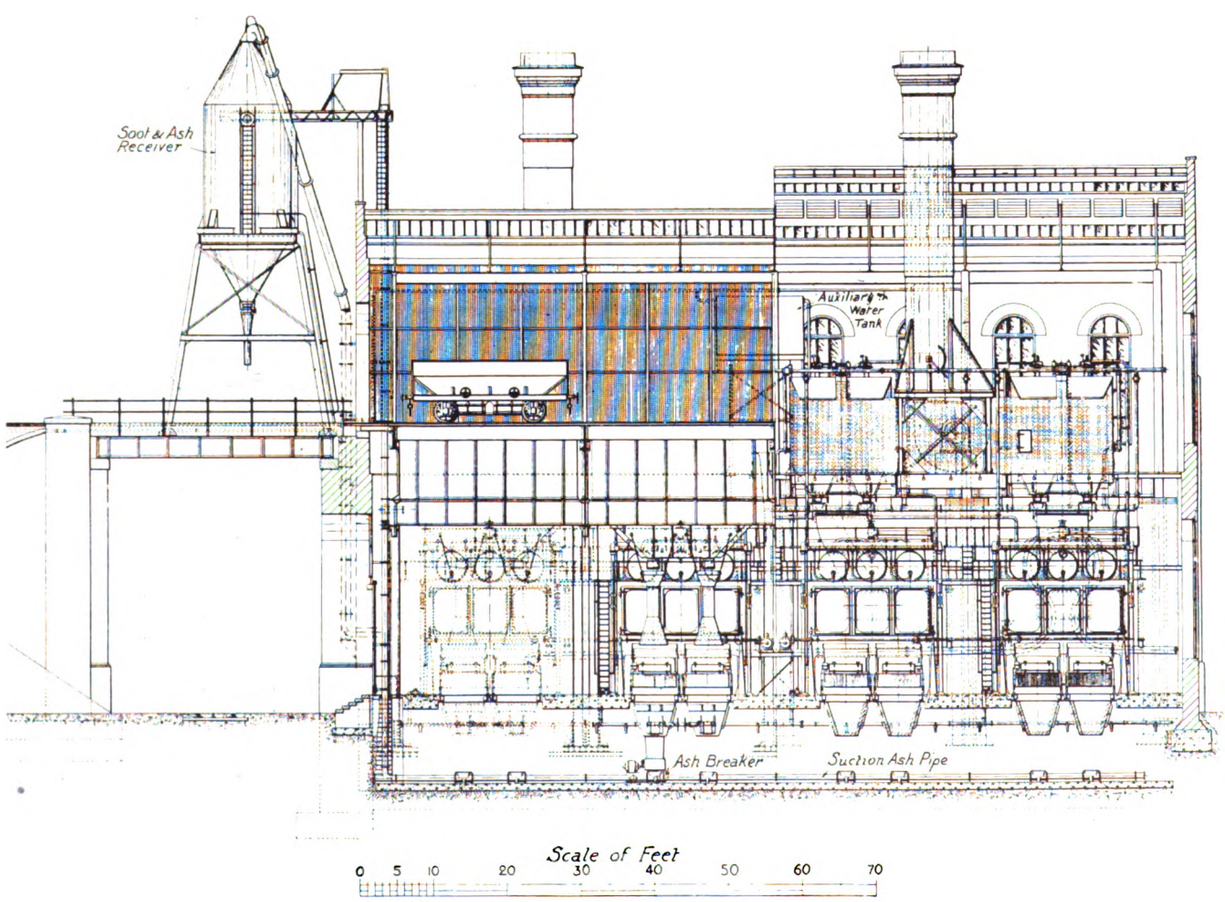


Fig. 5. Longitudinal Section through Boiler and Economiser Rooms.

Digitized by Google

surface is 2,635 square feet. Green's economisers are used, and have been placed above the boilers. This position was found to be the most advantageous, as it reduces the width of the boiler room, and the length of the chimney stack, thereby causing a smaller resistance to the products of combustion. Each boiler has its own economiser, which is fitted with 256 tubes, $4\frac{9}{16}$ in. diameter by 9 ft. long. The tubes are provided with three-phase motor, having a speed of 360 revolutions per minute. The motor is of the totally-enclosed squirrel cage type (Fig. 10).

The chimneys, manufactured by Messrs. Clayton, Son and Company, of Leeds, are made up of mild steel plates, varying from $\frac{5}{16}$ in. to $\frac{1}{2}$ in. in thickness. They are 6 ft. internal diameter, brick lined, the tops being 87 ft. 6 in. above the firing floor level.

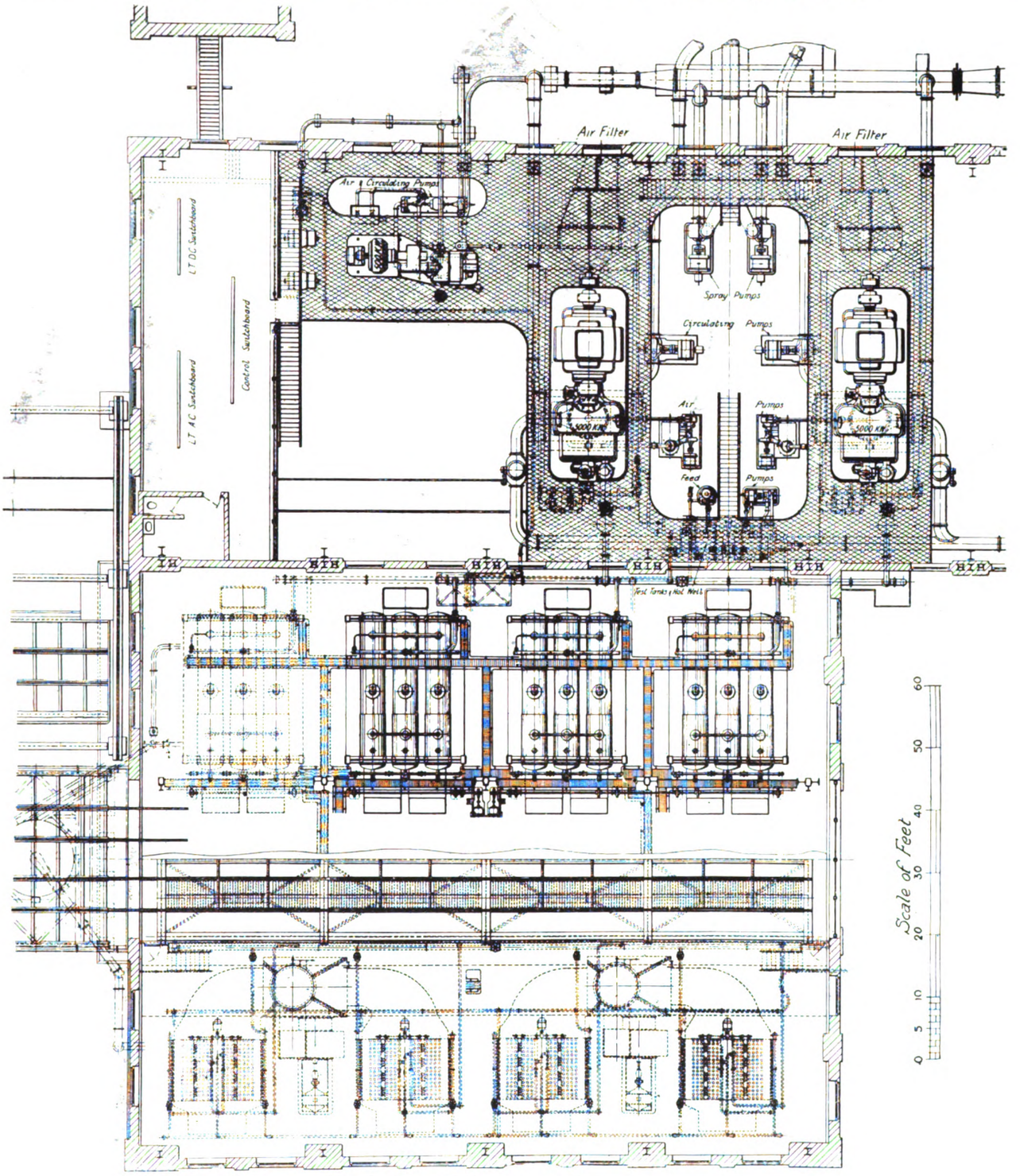


Fig. 6.—Plan of Turbine and Boiler Room.

electrically-driven scrapers. The induced fans are capable of dealing with the products of combustion from two boilers when working together. The fans were manufactured by Messrs. Musgrave and Company, and are provided with ring-lubricated, water-cooled bearings, and are driven by a 40-H.P., 440-volt,

Suction Ash Plant.—The ash from the boilers, after passing over the back end of the grate, drops into ash hoppers, and from that point is taken periodically, by means of Messrs. Babcock and Wilcox's suction ash arrangement, to a large receiver placed at the entrance to the coal bunker roads (Fig. 11). From this receiver

Digitized by Google

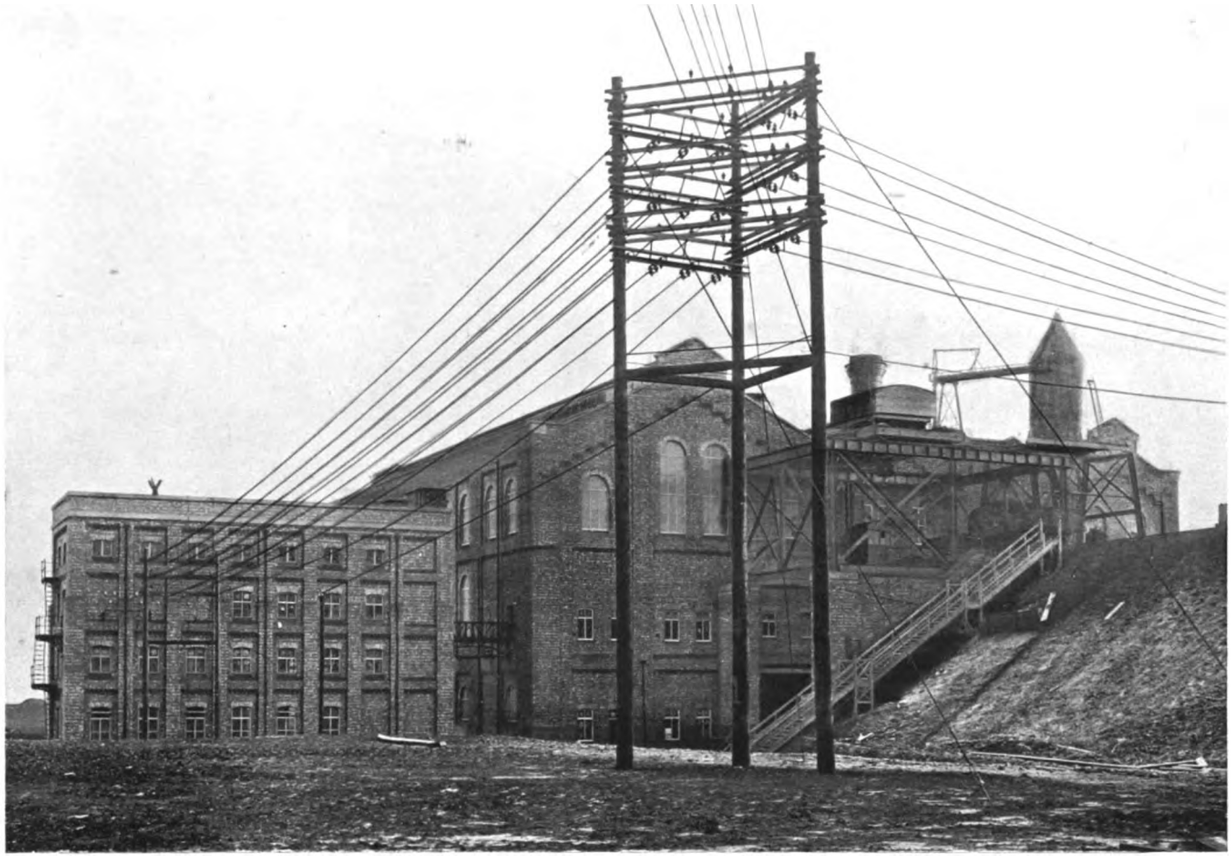


Fig. 7.—North view of Power Station, showing Outgoing Transmission Lines

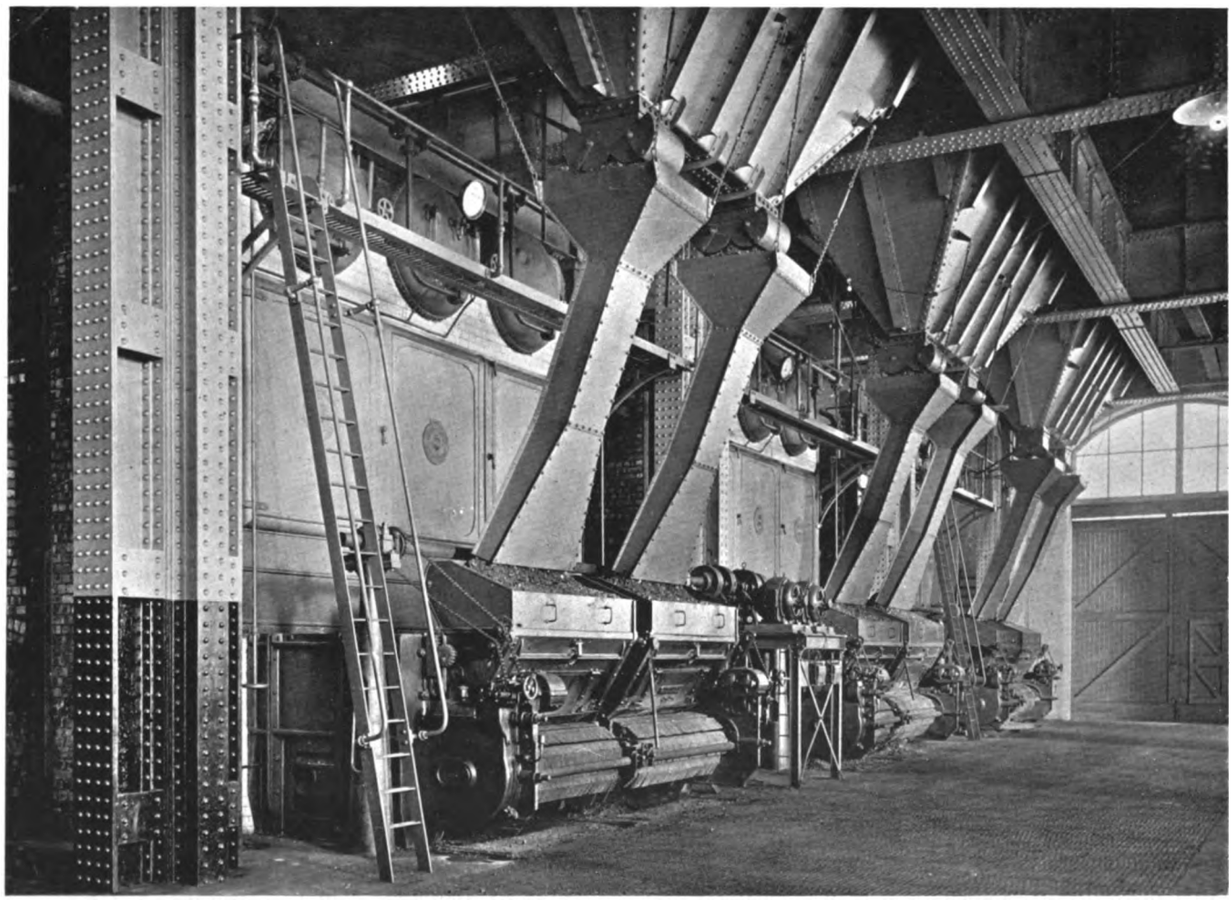


Fig. 9.—Interior of Boiler Room.

Digitized by Google

the ash, after having been cooled by a spray of water, injected into the receiver itself, is loaded periodically into wagons at the main line level. Provision is made so that soot from the economisers can be dealt with in the same way as the ash. Electrically-driven ash breakers are provided between the ash hopper and the suction ash pipe. The ash pipe is made of cast iron, and is 8 in. diameter by $1\frac{1}{4}$ in. thick. It runs along the ash tunnel the full length of the boiler room. In this pipe two inlet boxes are arranged underneath each boiler, so that the ash may drop straight into the ash hopper, through the breaker, direct into these inlet

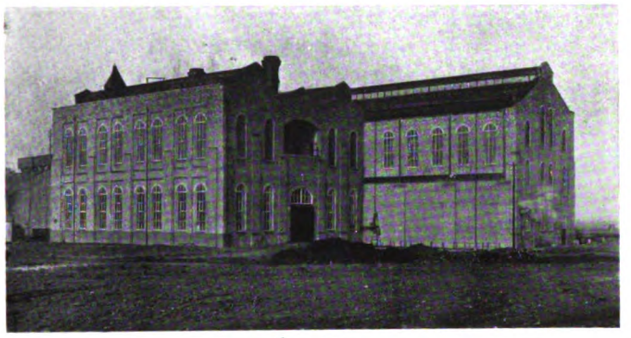


Fig. 8.—Power Station, south aspect.

boxes. At the end of the main ash pipe there is a bell-mouth opening for admitting air. The soot from the economisers is taken by a separate cast-iron pipe running underneath the economiser floor.

The ash receiver has a capacity of 30 tons, and is provided at the bottom with a two-way shoot, so that the contents may be discharged into wagons on either of the roads that run over the coal bunkers. The air exhauster is motor driven (Fig. 12), and is of the Roots' blower type, having a capacity of 3,250 cubic feet of air per minute at a pressure of about $2\frac{1}{2}$ lb. per square in. It was manufactured by the Sturtevant Engineering Company, U.S.A. This type of suction ash plant was fully described in the article on the London and South Western Railway Electrification in our issue of November 18 last.

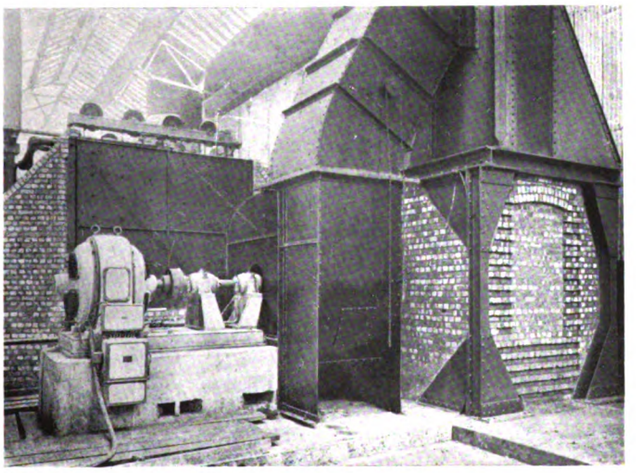


Fig. 10.—Induced Draught Fan and Motor.

Coal Bunkers and Sidings.—The coal bunkers are situated in the centre of the boiler house (Figs. 9 and 11), and are filled by means of bottom hopper wagons, the rail level being 37 ft. above the boiler room firing floor level and 7 ft. above the economiser floor level. The hoppers are constructed of mild steel plating, and are of ample capacity, holding 50 tons of coal without trimming. Corrugated sheet steel partitions separate the coal bunkers from the economisers.

Each boiler is fed by a separate hopper having two

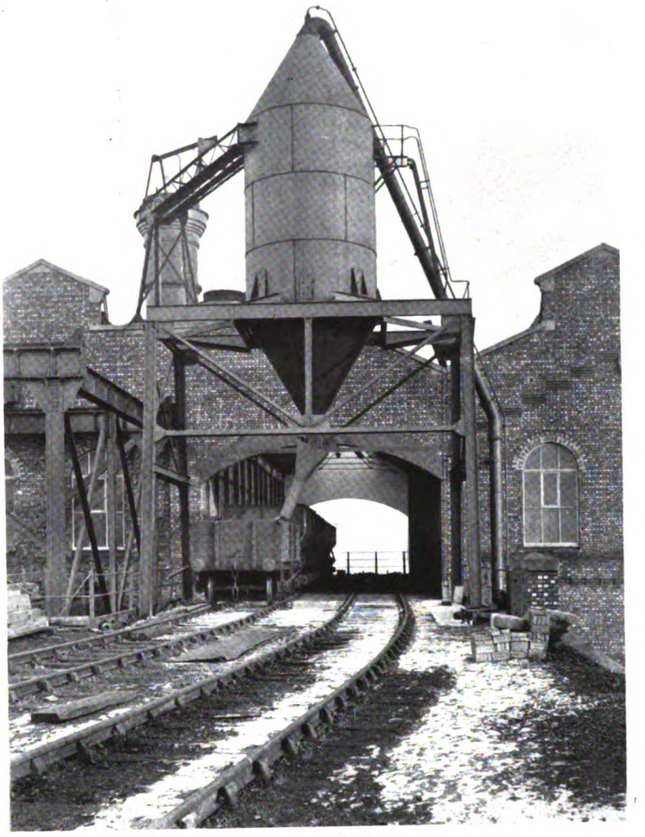


Fig. 11.—Ash Plant Receiver.

shoots directing the coal into the receivers from the chain grate stokers, suitable baffles controlling the supply. A 30-ton weighing machine is provided on the approach road for checking the coal supply. No

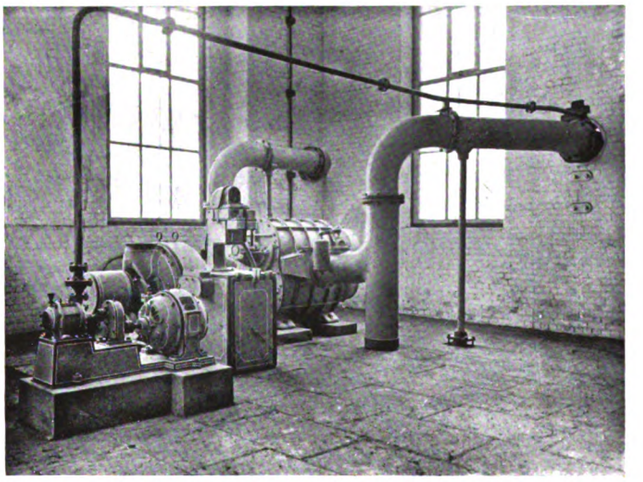


Fig. 12.—Ash Plant Blower.

weighing apparatus has been installed on the bunkers themselves.

There are three coal sidings for the exclusive use of the power-station; two are used for full and empty wagons respectively, having a capacity of twenty-four 20-ton hopper wagons each; and the third siding is

Digitized by Google

used chiefly for shunting purposes, and accommodates sixteen 20-ton hopper wagons. Convenient connections are made with the up and down main lines, and the sidings are so arranged that unnecessary shunting is reduced to a minimum, and does not involve the main lines.

Turbine Room.—The turbine room (Fig. 1)—188 ft. long and 64 ft. wide—has a floor of cast-iron non-slip grating. Suitable wells are arranged, so that all auxiliaries in the basement, which is twenty feet below, can be lifted directly by the crane. A 50-ton electric overhead travelling crane, made by Messrs. T. Broadbent and Sons, Huddersfield, is provided in the turbine room. It has a span of 61 ft., and travels the full length of the building.

5,000 *kw. Turbo Alternator Sets.*—Two main generator sets, each having a normal capacity of 5,000 KW., are installed. The turbines are manufactured by Messrs. Dick, Kerr and Company, Limited, Preston. They are of the impulse type, having a Curtiss wheel at the high pressure end, the remainder being on the Rateau principle. The speed is 1,500 revolutions per minute. Each turbine has two rows of wolfram steel blades on the velocity wheel, and ten rows of brass blades on the low pressure wheel, the axial and radial clearances being 5 mm. and 7 mm. respectively. The governor gear of each turbine is fitted with a small electric motor, enabling the gear to be controlled from the main switchboard. The total weight of each turbo-alternator is 115 tons 16 cwts. Each alternator consists of a Dick-Kerr two-pole three-phase machine generating at 6,600 volts, 25 cycles, and is capable of carrying 25 per cent. overload for two hours and 50 per cent. overload for five minutes. The alternators are self-ventilated by means of fans fitted on the shaft at each end of the rotor. The air for ventilation passes through Heenan and Froude wet air filters, each of which can deal with 25,000 to 30,000 cubic feet of air per minute, the air passing through the filter at an approximate velocity of 1,500 ft. per minute.

Each turbo-alternator is complete with its own condensing plant, the latter being manufactured by

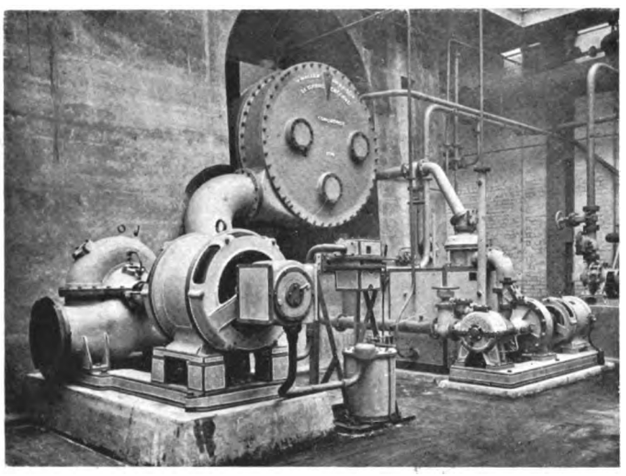


Fig. 13.—Condensing Plant, 5,000 kw. set.

Messrs. W. H. Allen, Son and Company, of Bedford, and consists of condenser, steam jet ejector, circulating water pump, kinetic air pump, extraction and delivery pumps (Fig. 13).

The condensers are of the surface type, of sufficient capacity to deal with 82,000 pounds of steam per hour, and are capable of maintaining a vacuum of 28·1 inches (barometer 30) at full load when supplied with cooling water at the rate of 6,700 gallons per minute at a temperature of 75 degrees Fahr. The condensers have a diameter of 80 inches, and each is fitted with 3,464 tubes having an internal diameter of $\frac{3}{4}$ in., the total cooling surface being 9,500 square feet. The weight of each condenser (exclusive of water) is 38 tons.

The circulating water pumps are of the "Conqueror" centrifugal self-regulating type, with 20 in. diameter suction and delivery branches, and are capable of delivering 6,700 gallons of water per minute, against a 35 ft. head when running at 485 revolutions per

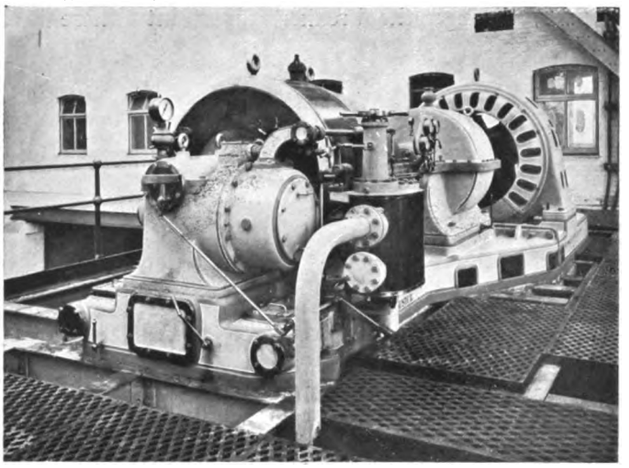


Fig. 14.—View of 500 kw. set.

minute. Each pump is directly driven by a Dick-Kerr slip ring induction motor, of 110 B.H.P. The steam jet ejector is supplied by a $1\frac{1}{4}$ in. steam pipe, and the estimated steam consumption is 0·75 per cent. of the turbine steam consumption. When on full load, this will take 465 lb. of steam per hour.

The kinetic air pump (7 in. bore, 45,000 gallons per hour, 90 ft. head), extraction pump (5 in. suction, 3 in. delivery, 10,200 gallons per hour, 40 ft. delivery head), and the delivery pump (3 in. suction and delivery 10,200 gallons per hour, 20 ft. head) are all mounted on one bed-plate, and driven by means of a Dick-Kerr 45 B.H.P. slip ring motor at 1,450 revolutions per minute.

500 *kw. Geared Turbo-Alternator.*—Power for the auxiliary apparatus is provided by a 500 KW. gear driven turbo-alternator, built by the British Westinghouse Company, of Manchester (Fig. 14). This set, which is complete with a surface condensing plant, generates power at 440 volts, 25 cycles, and the turbine is of the Westinghouse high pressure impulse type, running at 3,600 revolutions per minute. The turbine has two rows of nickel steel blades on the velocity wheel, and ten rows of nickel steel blades on the low pressure wheel, the axial and radial clearances being $\frac{1}{8}$ in., $\frac{3}{16}$ in., and $\frac{1}{4}$ in. respectively. The total weight of the turbo-alternator complete with gear and gear-case is approximately 30 tons.

The gearing, which gives a speed reduction 3,600–750 revolutions per minute, has been manufactured by Messrs. David Brown and Sons, Limited, of Huddersfield. The gear wheel has a rim of special high carbon steel built up on a steel spider, and has 183 teeth. The pinion is made from solid nickel steel and has 38 teeth, with a pitch of teeth 0·597 in. and a face width of 21 in.

The generator is of the Westinghouse alternating-current engine type, capable of giving a continuous output of 500 KW.

The condensing plant is on the Westinghouse-Leblanc patent system, and consists of condenser,

Digitized by Google

circulating water pump, air pump, and extraction and delivery pump. A Westinghouse surface four-flow type condenser is used, which has a cooling surface of 850 square ft. It is capable of dealing with the turbine exhaust and maintaining a vacuum of 27·5 in.–28·5 in.

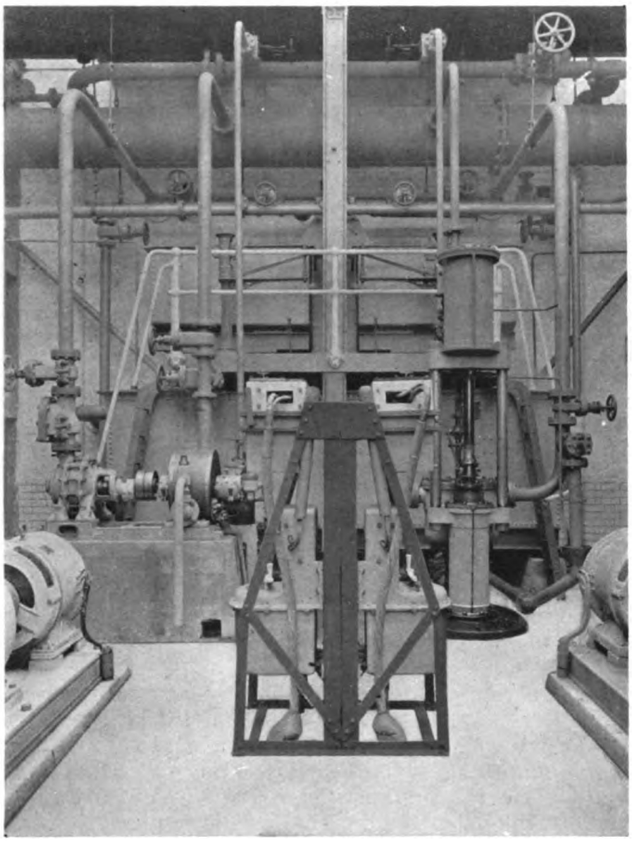


Fig. 15.—Boiler Feed Pumps, Test Tanks and Hot Well.

(barometer 30 in.) on full load, when supplied with cooling water at the rate of 784 gallons per minute at a temperature of 75 deg. Fahr. It is 6 ft. 8½ in. between tube plates, and contains 652 tubes of solid drawn brass ¾ in. O.D. and 18 I.W.G. The total weight is approximately 5 tons.

The circulating water pump is of the centrifugal type, having 8 in. suction and delivery branches, and is capable of delivering 784 gallons of water per minute against a head of 23 ft. when running at 1,440 revolutions per minute.

The air pump is of the Westinghouse-Leblanc rotary valveless dry air type, with a 4 in. suction branch and a 3 in. delivery branch. A centrifugal extraction and delivery pump is used, capable of delivering 11·6 gallons of water per minute against a head of 8 ft., when running at 1,440 revolutions per minute. All the three pumps are mounted on one common bed plate, and driven by a 22-B.H.P. motor, and the approximate weight of the combined set is two tons.

The hotwell (Fig. 15) is arranged centrally between the main generators, and is of liberal capacity, holding 1,460 gallons. It is divided into two compartments, so that the valves may be examined, and the tanks cleaned and painted, without putting it out of commission. Provision is made for a supply of make-up water from an auxiliary tank, fed from the circulating water mains. This water is treated in a softener, and the supply regulated by a 3 in. float valve in the hotwell. An emergency connection is also taken from the town main; this also is controlled by a similar valve operating at a lower level in the hotwell.

The condensate from the turbines is introduced at a point below the minimum water level in the hotwell, so as to prevent aeration. Connections are taken from the underside of the hotwell, one from each division, uniting in a common main to the feed pump suction. The water in the hotwell is heated by means of four 3 in. exhaust steam injectors, the exhaust steam being taken from the turbine feed pump. Two test tanks, mounted on weighing machines, are carried on the top of the hotwell, and arranged to work alternately and independently of each other. The condensates from all the sets are so conveyed to the hotwell that the condensate from any one set can be passed through the test tanks, while the others are delivered directly to the hotwell.

A suitable tumbler, constructed to direct the flow of water into one tank or the other, is placed between and above the two tanks. By this means, the water is diverted without interfering with the continuous delivery from the set under test. Each test tank has a total capacity of 3,800 lb. of water, discharging through a 6 in. quick-acting valve directly into the hotwell below.

The weighing machines are graduated to read zero when the tanks are empty.

Boiler Feed Pumps.—At present the station is equipped with two boiler feed pumps, supplied by Mather and Platt, Limited, of Manchester; one a turbine pump, and the other a reciprocating pump, both capable of delivering 10,000 gallons of feed water per hour against a head of 217 lb. per square in. It is interesting to note that the reciprocating pump is the only reciprocating machine in the station. It is intended that the turbine pump should be used in service, and the reciprocator as a standby. Both pumps are situated near the hotwell, and at such a level that they are always flooded (Fig. 15).

The turbine pump is of the high lift, multiple chamber type, absorbing 40 B.H.P. It has a 5 in. suction, and a 4 in. delivery, and is driven by a 45-B.H.P. high-pressure turbine of the horizontal Curtiss type, made by the British Thomson-Houston Company, of Rugby, and runs at 3,000 revolutions per minute. The weight of the combined set is approximately one ton.

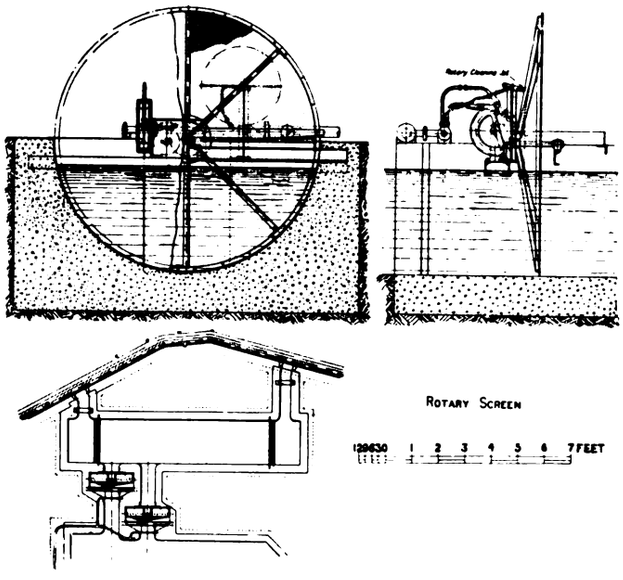


Fig. 16.—Plan and Elevations of Rotary Screen.

The reciprocating pump is double acting, and makes 13 double strokes per minute. Its chief dimensions are, cylinder 10 in. diameter, 24 in. stroke, suction branch 6 in. diameter, and delivery branch 4 in. diameter.

Digitized by Google

Spray Pumps.—Two spray pumps are installed for the purpose of dealing with the cooling of the circulating water. These pumps, with their motors, are exactly similar to the circulating water pumps for the main sets.

Condensing water is obtained from the canal, and it passes first through a bar screen, which stops the entrance of the larger pieces of floating matter, and then through rotary screens, which check the smaller weeds, etc., before reaching the cooling pond. The rotary screens (shown in Figs. 16 and 17) are two in number, each 10 ft. in diameter, and rotate at one revolution per minute. They are driven by Pelton wheels through worm gearing; the water for driving them is obtained from the spray pump discharge, and is under a head of 18 ft. When the spray pumps are not working the water is obtained from the auxiliary tank. The screens are cleaned by means of rotating jets, which spray on the exposed portion of the screens, on the side away from the incoming supply of cooling water. A diagram of the circulating water-pipes is shown in Fig. 18.

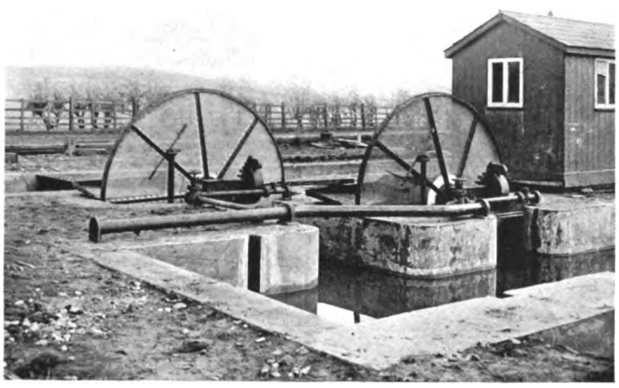


Fig. 17.—Rotary Screens.

Fig. 19.—Condensing Water Outlet to Canal.

The water flows from the cooling pond into a brick-lined collecting pit, and thence by gravity down a 45 in. pipe into the circulating water suction main. This suction main has a maximum diameter of 62 in., and is of sufficient area to supply the demand of the whole station when extensions are completed. The present pipe supplies the two main condensers, the auxiliary condenser, also the water to the auxiliary tank, and is capable of easy extension as required. Water having passed through the condensers, flows by gravity into a 62 in. diameter discharge main running parallel with the suction main. This pipe is fitted with suitable branches for future extensions, and discharges into a concrete channel running parallel with the canal, having outlets at convenient points. This channel is shown in Fig. 19.

Connections are taken from the discharge main to the spray pumps, so that the hot circulating water can be pumped back to the cooling pond through the spray nozzles. Thus, two methods of cooling are available, or a combination of both methods can be used at the same time. The discharge pipe from the spray pumps to the cooling pond is 32 in. diameter, and runs alongside the 45 in. diameter delivery pipe from the pond.

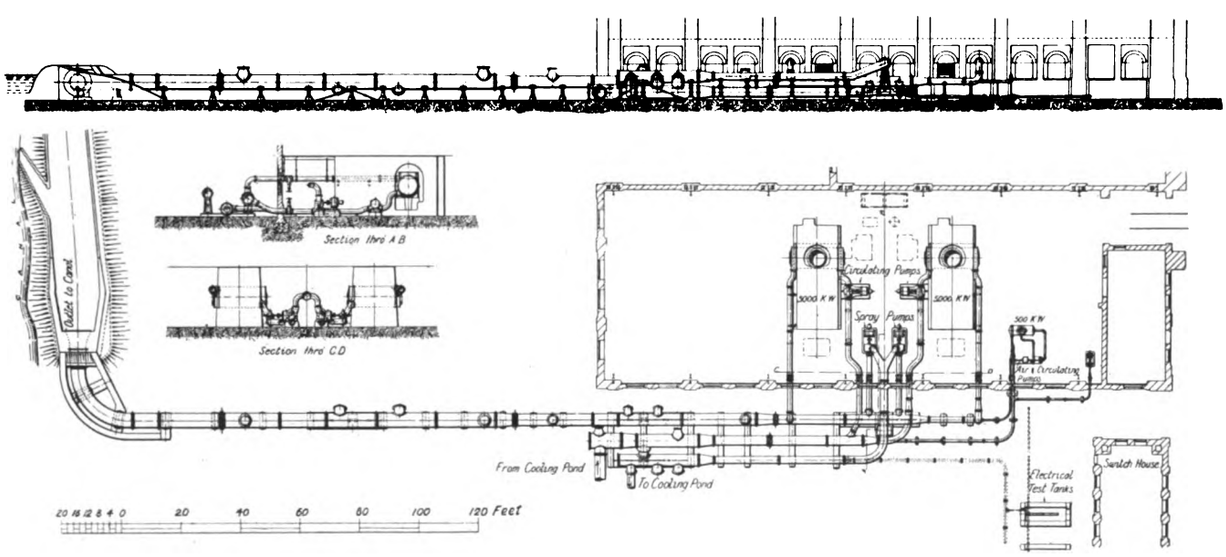


Fig. 18.—Arrangement of Circulating Water Pipes.

Cooling Pond.—This is 408 ft. long, 109 ft. wide, and 2 ft. 6 in. deep. The spraying arrangement has been supplied by Harrison, Son and Jobson, Limited, Middlesbrough, and is capable of cooling 402,000 gallons of water per hour from 95 deg. Fahr. to 75 deg. Fahr. under normal atmospheric conditions; it is so arranged that slight extension to the pipe work will increase the capacity to 804,000 gallons per hour. The

Digitized by Google

piping is constructed in four separate units, each unit being controlled by a valve situated in a convenient position on the pond side.

Each unit is divided into three lengths of parallel piping, 32 ft. apart. Screwed in each pipe are 24 brass nozzles spaced 3 ft. apart, thus making a total of 288 nozzles for the present plant. Each nozzle orifice has an area of 0·39 square inch, and is capable of passing 1,396 gallons of water per hour at a head of 18 ft. The circulating water-pipes have been manufactured by Messrs. Clayton, Son and Company, of Leeds, and at the railway company's works at Horwich.

Auxiliary Water Supply.—An auxiliary water supply has been installed to meet the demand for water other than that required from the town main. This water is delivered into a storage tank from the circulating water suction main by means of a Mather and Platt turbine pump situated in the turbine room basement. This pump has a capacity of 12,000 gallons per hour, against a head of 50 ft., when running at a speed of 1,420 revolutions per minute. It has a 5 in. diameter suction, and a 4 in. diameter delivery, and is driven by a 6 H.P. induction motor. The pump and motor are mounted on one common bed-plate. The auxiliary tank is situated above the economiser floor, and has a capacity of 2,900 gallons.

The delivery water from the pump is controlled by a 5 in. float valve in the tank. An emergency connection is taken from the town main, and is controlled by a 3 in. float valve operating at a lower level than the 5 in. valve. The auxiliary tank supplies water to the hotwell for make-up, to the main condensers for flooding purposes, to the oil coolers, bearings, and smaller details in the turbine and boiler rooms.

Water Softener.—The water softener, manufactured by Bowes, Scott and Western, Limited, London, has a capacity of 1,000 to 1,500 gallons of water per hour. It is 20 ft. 6 in. high, with a diameter of 6 ft. 3 in.; the decanter has a settling tank capacity of 3,940 gallons.

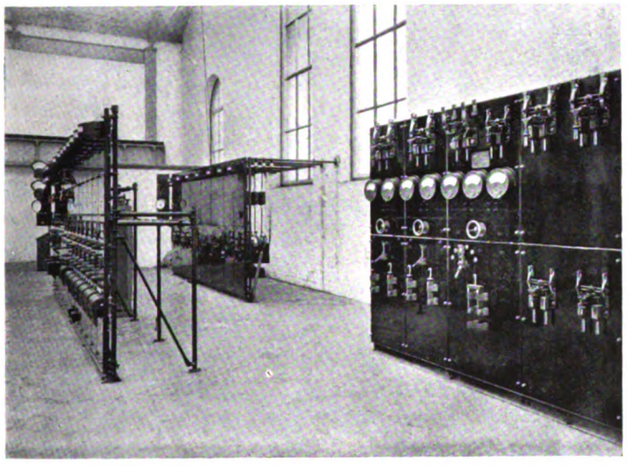


Fig. 20.—Switchboards on Control Platform.

Control Boards and Switchgear.

At the end of the station are arranged stores, offices, and switchboard platform. The stores are alongside the main entrance on the basement floor, and immediately above them on the turbine room floor are arranged the offices for the operating staff. The control switchboards are placed on a gallery above the offices, overlooking the turbine room, and the control wiring is accommodated in the cable room between the ceiling of the offices and the switchboard gallery.

The arrangement of the switchboards on the control platform is shown in Fig. 20.

There are three separate boards :—

(1) The main control board for operating the main units and feeders.
(2) 440-volt A.C. board operating the station auxiliaries.
(3) D.C. board controlling the control circuits, lighting, cranes, and standby battery for the control circuits.

Switchgear.—The switchgear, manufactured by the British Thomson Houston Company, is of the solenoid operated remote control type. The main switchgear is housed in a separate building (see Fig. 6), access to which is obtained by a footbridge from the turbine room floor. The switchhouse consists of a four-storey building, on the ground floor of which is housed the battery consisting of 70 cells. The first floor is the cable room, the second floor the switch room, and the third floor the bus-bar room. A plan of the switchhouse is shown in Fig. 21 and a cross section in Fig. 22.

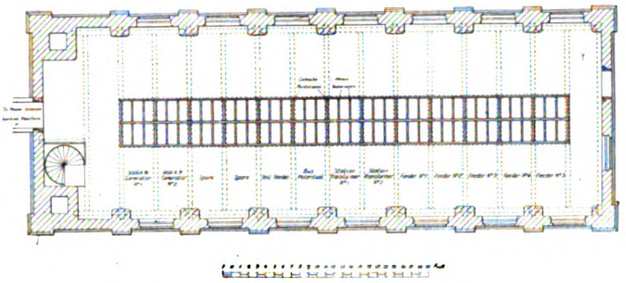


Fig 21.—Sectional Plan of Switchhouse.

The control board of the gallery consists of 13 panels, on which are mounted the necessary equipment for controlling the main switchgear for the two 5,000-KW. generator equipments, with two blank panels for future extensions; five 300-KW. feeder equipments, two 250-KW. transformer equipments, one test feeder equipment, and one synchronising equipment. The 400-volt, three-phase switchboard consists of five panels, on which are mounted hand-operated oil switches and the necessary gear for controlling two 250-KW. transformer equipments, one 500-KW. generator, two rotary converter equipments, and two feeder panels. The D.C. board consists of five panels, two controlling the D.C. side of the rotary converters, one the 125-volts battery, and two feeder panels, for the main control, lighting, and crane motors.

The main switchgear in the switchhouse is contained in cells built up of moulded stone (Figs. 23 and 24), each phase being separated throughout with barriers of the same material. The bus-bars with the bus-bar isolating switches are placed on the floor above the switch room, the cell construction being of a similar character to the above. The fronts of the cells are covered by expanded metal sliding screens, these screens being interlocked with isolating switches, so that it is impossible to open out any cell until the isolating switches controlling the apparatus in that cell have been opened. The cells containing the oil switches, which are shown in Fig. 24, have metal doors which are not interlocked.

The main cables are suspended from the footbridge which gives access to the switch room, and enter the cable room immediately beneath the switch room, being taken up to their respective cells as required. The outgoing feeders are carried from their respective cells, and supported by insulators from the ceiling, passing through the wall of the switch house by means of leading-in tubes, to the overhead lines outside (Fig. 7).

The bus-bars are in duplicate, and so arranged that any machine, or any set of feeders, can be connected to

Digitized by Google

either set of bus-bars, but no machine, or no particular set of feeders, can be connected to both sets of bars at the same time, the isolating switches for the bus-bars being interlocked to prevent this. By this means, one set of bus-bars can be used for power purposes, whilst the other at the same time can be utilised for general test purposes. The order of the cells is exactly the same as that of the control switchboard.

The main oil switches are operated by means of pull type switches on the control board, which energise relay switches mounted on the oil switch. Relays are used in order to restrict the size of the cable required between the control board and the switch gear. An indication of the position of the switch is given by red and green lamps, which are placed vertically above and below the pull type switch. The controlling switch for the lamps is operated by the movement of the oil switch itself. The voltage of the control current is 125.

A throw-over switch is provided on the synchronising panel, by means of which an emergency excitation can be brought into operation should the exciters fail. This excitation current is regulated by means of a rheostat, which is mounted immediately behind this panel.

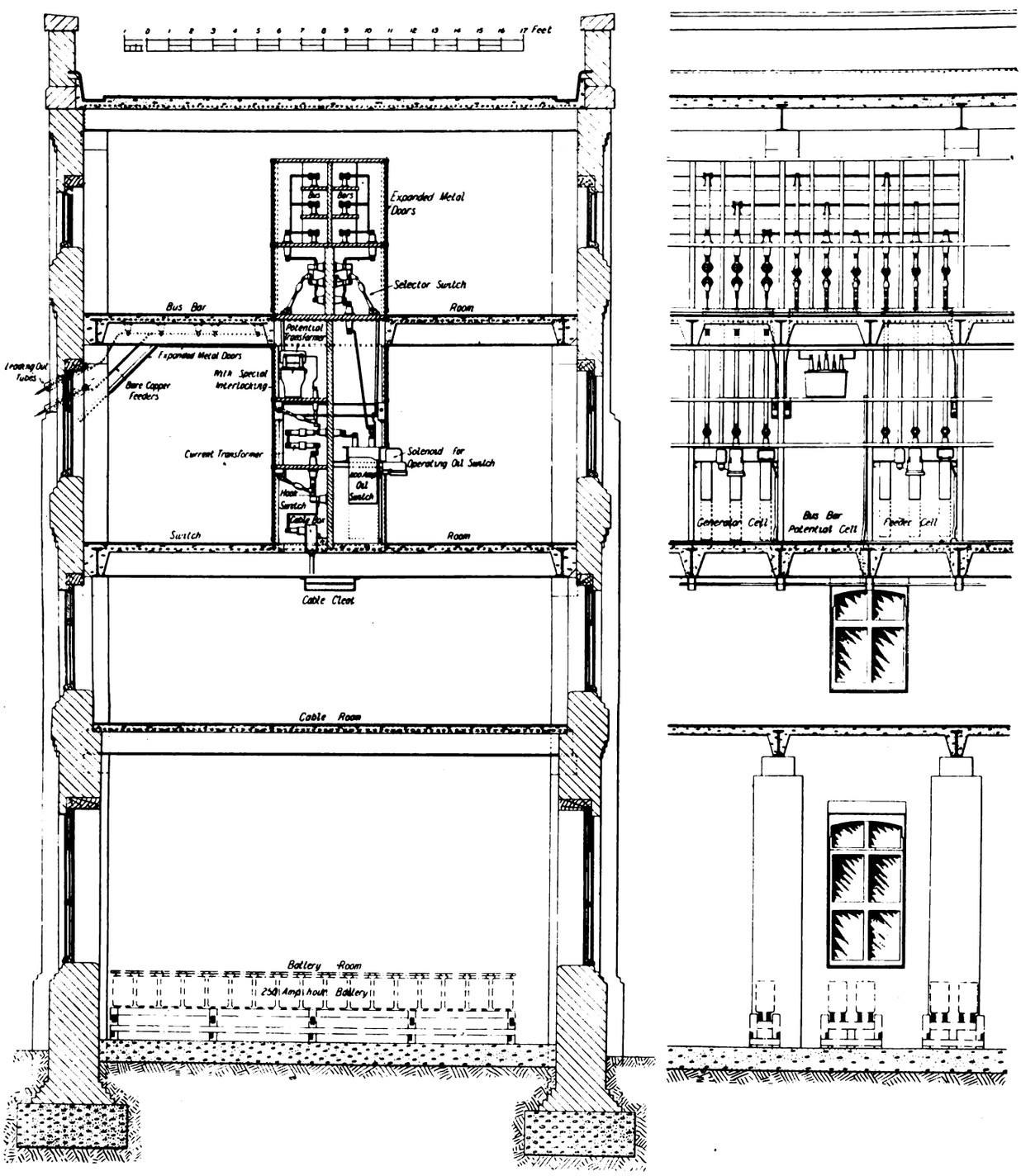


Fig. 22.—Cross Section and Part Elevation of Switchhouse.

Digitized by Google

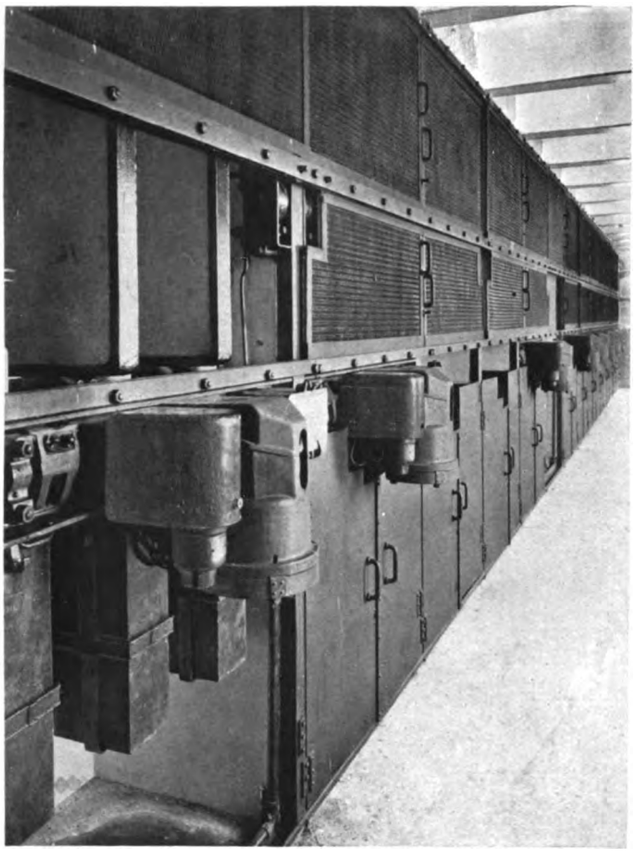


Fig. 23.—Oblique view of Oil Switches on second floor of Switch-house.

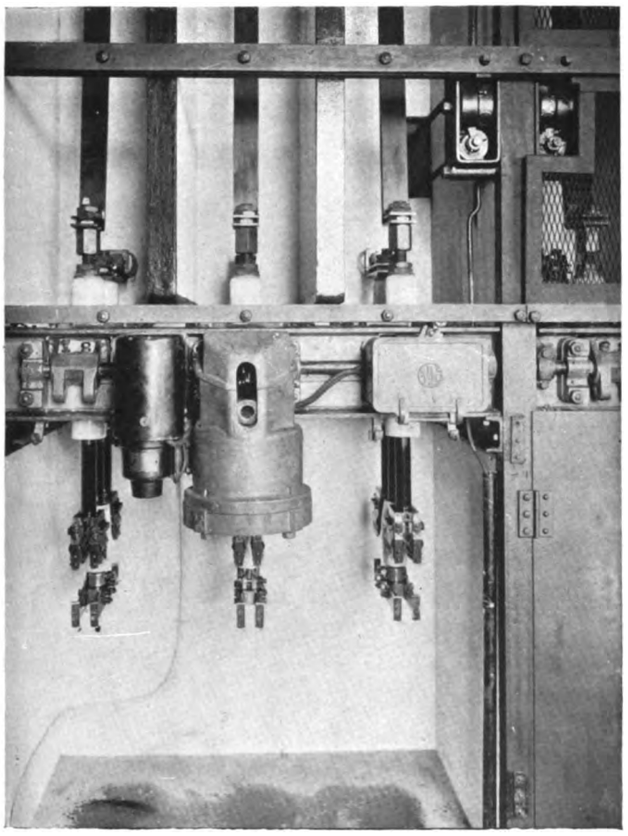


Fig. 24.—Front view of Oil Switches, the Oil Containers being removed.

With the switchgear a system of balance protective gear has been provided for the turbo-alternators and the station transformers. This is operated by means of current transformers and relays. Should a fault occur between phases, or between any phase and earth these relays operate, and trip the main oil switch.

In addition, automatic field switches are provided for the turbo-alternators. These open the field circuit automatically when an internal fault occurs in the turbo-alternator, which at the same time operates the protective gear and trips the main oil switch.

In normal running the station auxiliaries will be worked through two station transformers of 250 KW. each, manufactured by the British Transformer Co., of Heyes, converting from 6,600 to 440 volts, three-phase, and enabling the 500 KW. auxiliary set to be shut down. During periods of very light load, such as lighting of stations during the night time, the auxiliary set can be run alone, and the voltage raised through the same transformers to 6,600 for transmission to the various stations or goods yards.

The D.C. at 125 volts is obtained by means of two rotary converters operating through transformers from the 440 volt supply. Each of these converters has a capacity of 50 KW., and they were made by the British Westinghouse Company. They are used in conjunction with a 70-cell battery (made by the Chloride Electrical Storage Company, of Clifton Junction) and a small booster.

Fig. 25.—High Tension Transmission Lines, carried on H poles.

All drainage from the station is treated by a drainage plant situated at some distance from the building. After treatment, the drainage is dealt with by means of a vertical spindle "Sunturbo" pump, manufactured by Peter Pilkington, Limited, of Bamber Bridge, near Preston. This pump is capable of dealing with 80,000 gallons of water per hour, against a total head of 32 ft., when running at a speed of 715 revolutions per minute, and is driven through vertical shafting by a 4-pole, 20-H.P. three-phase motor. The weight of the combined set is 1¼ tons approximately.

High Tension Transmission Line.

Two main feeder lines are used to convey the power from Clifton Junction power-station :—

(1) The north line, 4 miles long, runs from the Clifton power-station to Radcliffe sub-station, *via* Ringley Road.
(2) The south line, 4¼ miles long, runs from Clifton power-station to Manchester, Victoria sub-station, *via* Pendleton New.

Both these feeders are of the same capacity, and consist of overhead conductors, of three cables in duplicate, and three-core cables, paper insulated, lead covered, and armoured with steel galvanised wires,

Digitized by Google

in duplicate. The overhead cable, supplied by the British Insulated and Helsby Cables, Limited, Prescot, and Thomas Bolton and Sons, Limited, consists of 7/10 S.W.G. per phase; the three-core of 19/14 S.W.G. per phase was manufactured by W. T. Henley's Telegraph Works Company, Limited, London.

The outer diameter of the three-core cable is 2·293 in., the armouring 0·1 in., and the thickness of the lead 0·14 in. The joints are of the plumbed lead sleeve type, and the conductors are insulated with paper sleeves, the boxes being filled in with compound. The north line is practically all overhead, cable only being used when passing under public bridges.

The south line consists of 1¼ miles of overhead and 3½ miles of cable. The overhead is carried throughout on "H" poles (Fig. 25), the conductors being arranged three on each side of one pole, the other being left for future extensions. The standard span used is 70 yards. The three-core cable is carried on posts, and, where convenient, on wall brackets. Both lines are in duplicate, and under ordinary working conditions will both be in use.

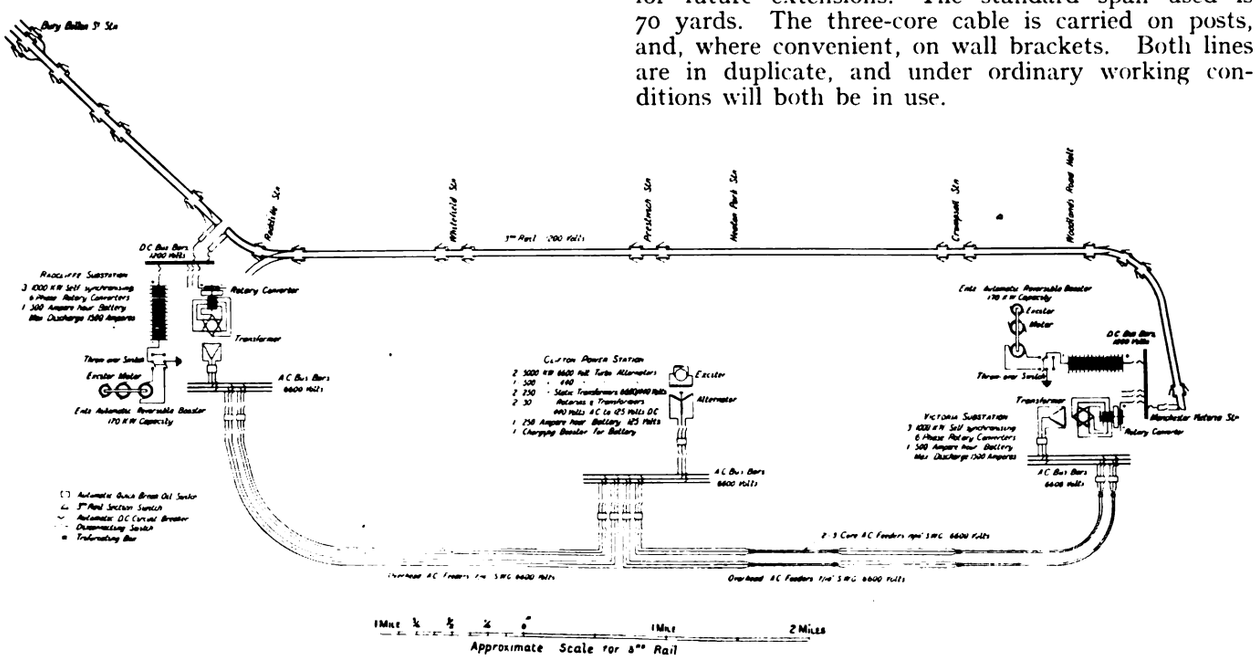


Fig. 26.—Diagram of Electrical Connections from Power Station to Sub-Stations and Track.

The "H" poles consist of two fir poles of an average diameter of 10 in., six feet from the butt. The cross arms supporting the insulators are of channel iron, 4 in. by 2 in. by ½ in., clipped on to the pole. The pole is also braced with wooden struts and bolts, but no anchor stays are used except at points where the line makes an angle. The whole of the armouring, and also the ironwork on the poles, is earthed to copper earthing plates, at quarter-mile intervals. No lightning

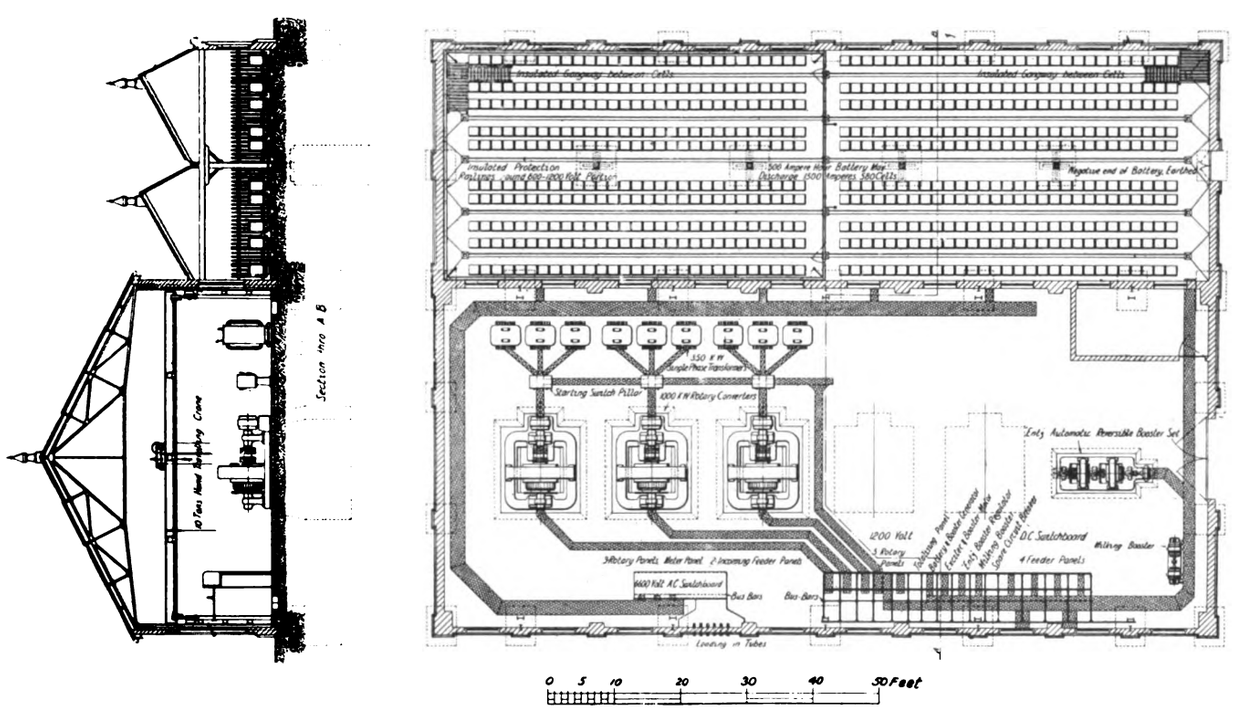


Fig. 27.—Plan and Cross Section of Radcliffe Sub-Station.

Digitized by Google

arresters are used, but at the points where the cables enter the power-station and sub-stations, choking coils are provided.

SUB-STATIONS.

There are two sub-stations, situate at Manchester (Victoria Station) and Radcliffe, and Fig. 26 shows a diagram of the transmission from the power-station to the sub-stations, and thence to the live rail.

Each sub-station is a combined rotary and battery sub-station, the equipment in each being identical, though the arrangement at Manchester is modified slightly due to its being placed in an existing building.

Fig. 27 gives a plan and elevation of the sub-station at Radcliffe.

synchronising. No arrangements for starting from the D.C. side are provided.

Three transformers, also supplied by Messrs. Dick, Kerr and Company, Limited, are used for each rotary converter, each 350 K.V.A., and wound for a ratio of 6,600–900. They are of the oil-cooled type, and enclosed in sheet steel welded cases fitted with external tubes for radiating the heat and circulating the oil. The tubes are welded into position, and this gives a perfectly oil-tight case. The terminals for both primary and secondary leads are brought up through porcelain insulators at the top of the case, and connections are made on the high tension side through short leads and trifurcating boxes to the three-core

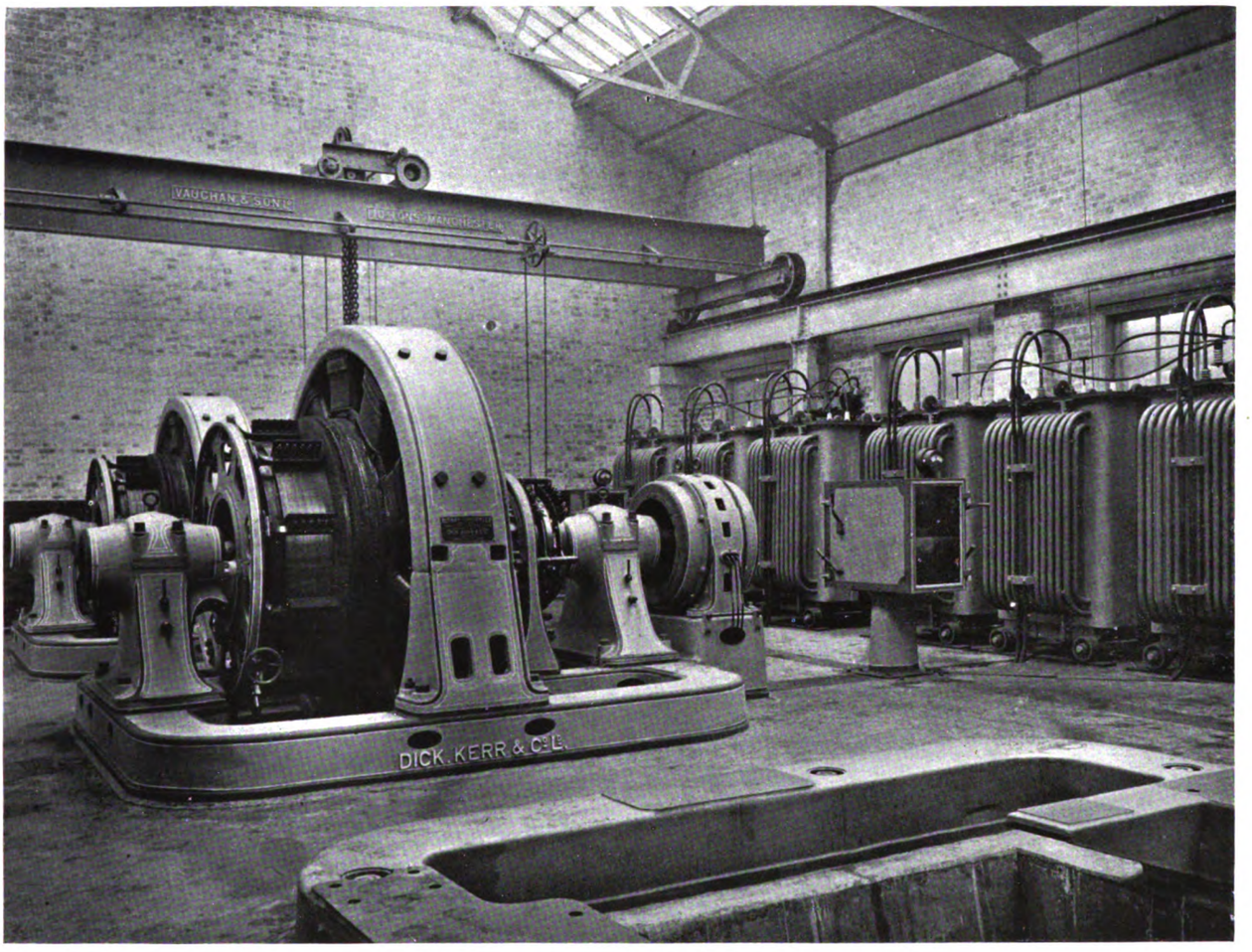


Fig. 28.—1,000 kw. Rotary and Transformers in Sub-Station.

Rotaries.—Each sub-station is equipped with three rotary converters, manufactured by Dick, Kerr and Company, Limited, Preston (Fig. 28), of 1,000 KW., six-phase, 25 cycles, 10 poles, and 300 revolutions per minute. The overload capacity of each is 100 per cent. momentarily, and they can be run continuously at 25 per cent. overload. They are arranged with an induction motor on the end of the main shaft for starting and self-

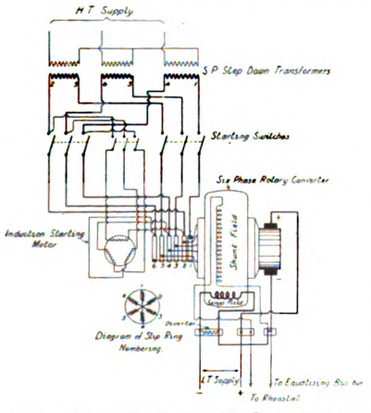


Fig. 29.—Diagram of Connections of Rotary Converter and Starting Motor.

cables from the high-tension switchgear. The low-tension leads are taken to the starting pillar and thence to the rotary. The diagram of connections is shown in Fig. 29.

Battery.—An Entz booster of the automatic reversible type with carbon regulator, made by Mather and Platt, Limited, for the Chloride Electrical Storage Company, Limited, is installed in the rotary room. This consists of three continuous-current machines, booster, motor and exciter, coupled together and mounted on one bedplate, giving an output of 900 amperes, 185 volts continuously, and will give 2,000 amperes at 190 volts for 15 seconds. Its output for charging the battery is 300 amperes at 300 volts continuously, and the voltage can be raised to 400 for overcharging. These latter ratings are obtained by hand regulation.

The booster is shunt wound and is excited from the exciter for automatic working, and from a portion of the

Digitized by Google

battery for hand regulation. The exciter is shunt wound and is separately excited from a portion of the battery. Its excitation is controlled by means of an automatic carbon regulator, connected up on the principle of the "Wheatstone Bridge" and operated by the main generator output. The exciter is capable of exciting the booster fully when the latter is doing its regulating work. In order to prevent a lag in reversing, the exciter is designed to give three times the excitation voltage necessary to give the required boost, and the carbon regulator automatically throttles the excess current when the correct boost has been reached.

The motor is capable of driving the booster at all loads when running off a 1,200-volt circuit, at the speed of 520 revolutions per minute. The speed can be raised to 650 by means of a shunt regulator in order to obtain the overcharge voltage. The set is provided with a device suitable for breaking the circuit of the motor when the speed of the set exceeds a definite amount.

All the cables from the switchboard to the rotaries, transformers, boosters, etc., are carried in concrete ducts in the flooring of the sub-station. These ducts are covered in by steel non-slip plates.

The battery, which is housed in a separate building outside the rotary building, consists of 580 Plantide cells, manufactured by the Chloride Electrical Storage Company, Limited, Clifton Junction. The capacity is 500 ampere-hours on the one-hour rating, and the charging current can be raised up to 1,500 amperes for 15 seconds.

Each cell is contained in a pitch pine box lined with sheet lead, and this box is of such a size that the capacity of the battery can be increased ultimately to 800 ampere-hours by the addition of more plates. The positive plates are of the "formed" type, and the negative plates are of the "box" or "cage" type, each plate consisting of an "antimonial" lead cage in halves, rivetted together. The plates are perforated and the active material held in pockets. The plates are separated by wooden dowels, which also act as a support, and are suspended on stout glass slabs resting on the bottom of the cell. The stands are of pitch pine, protected by anti-sulphuric paint, and are supported on strong porcelain insulators.

Each battery is divided into two portions, which are connected through an isolating switch. The high voltage portion (600–1,200) is partitioned off by wooden railings with gates, which are kept locked, so that access can only be obtained by authorised persons. The cells of this portion are protected by wooden rails mounted on insulators; wooden gangways, which are also mounted on insulators, are placed between the cells. This arrangement has been carried out to prevent accidental shock of over 600 volts.

When it is required to carry out work on this portion of the battery, the isolating switches are used, which reduces it to the same condition as the low voltage half.

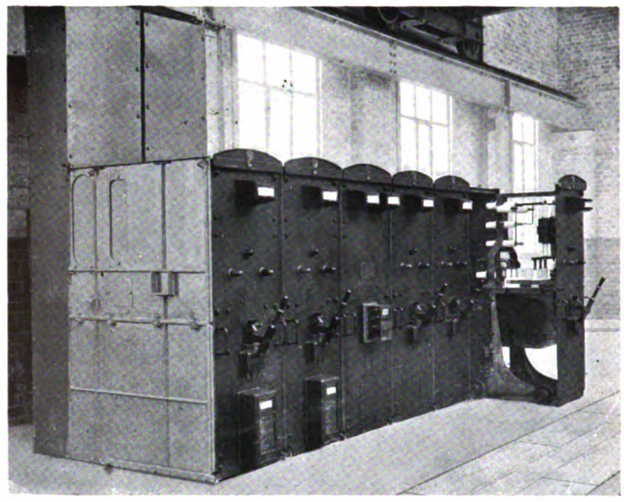


Fig. 30.—View of Alternating Current Board.

A combined charging and milking booster, manufactured by Messrs. Mather and Platt for the Chloride Electrical Storage Company, for the battery, is also installed in the rotary room, and consists of two continuous current machines—one motor and one generator—coupled together. This set is capable of charging the cells, fifty in number, which are connected to the Entz booster, in two hours a day, charging 25 cells at a time, and giving 45 ampere at 40-70 volts. The motor is suitable for working on a 1,200-volt circuit, and the booster is arranged for exciting from the cells to which the Entz regulator is connected. The set is also capable of milking the cells with an output of 200 ampere at 2 to 14 volts.

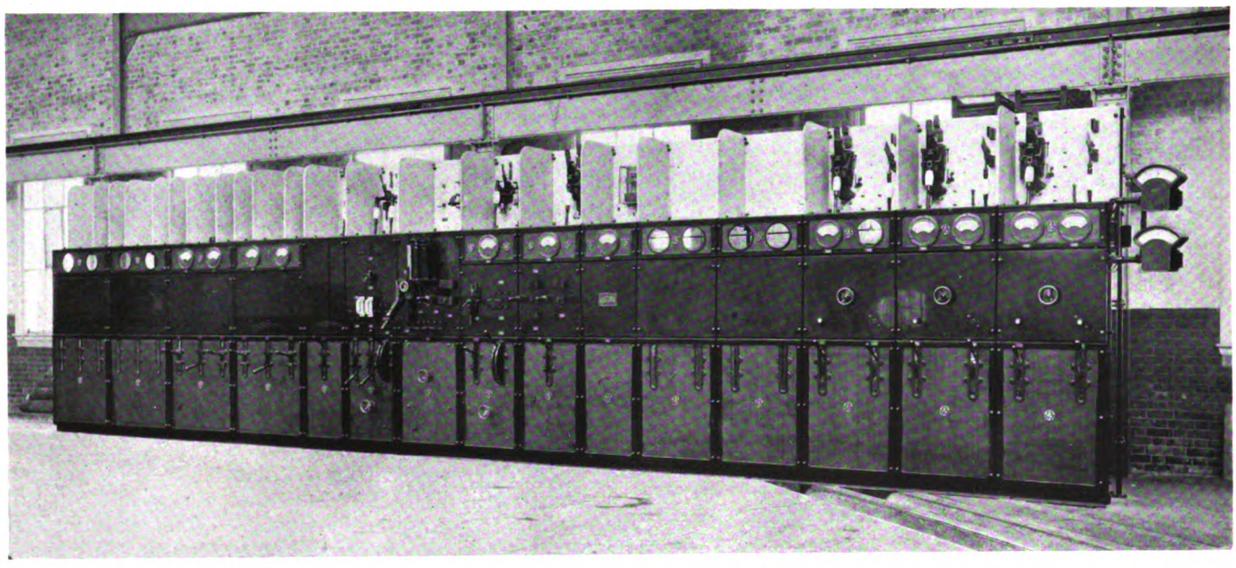


Fig. 31.—Direct-Current Switchboard in Sub-Station.

Switchgear.—The switchgear (Figs. 30 and 31) has been supplied by the British Thomson-Houston

Digitized by Google

Fig. 32.—View showing Position of Live Rail and Fourth Rail.

Fig. 33.—Position of Live Rail and Fourth Rail at Radcliffe Junction.

Digitized by Google

Company, and is in two parts, one of the "cubicle" type controlling the high-tension feeder and transformer leads, and the other of the "flat-board" type controlling the D.C. rotaries, battery, booster, and live rail. Both boards are placed on the ground floor of the station. The high-tension apparatus is contained in six cubicles, Nos. 1 and 2 controlling the duplicate feeders, No. 3 being the bus-bar potential feeder, and Nos. 4, 5, and 6 controlling the transformers for the three rotary converters. The feeder and high-tension cubicles each contain a hand-operated oil switch, the connections to the bus-bars being made through switch clips at the back. The arrangement is such that the whole of the apparatus can be withdrawn from the cubicle for inspection purposes, interlocking devices being used to prevent the apparatus being withdrawn or replaced, when the oil switch is closed.

The D.C. board, being 1,200 volts, is arranged so that there is no live contact on the front of the board, the main switches and circuit breakers, and all 1,200 volt apparatus being placed above the board in cubicles divided from each other by partitions (Fig. 31). This board consists of fifteen panels, 4 ft. × 15 ft. high. All the switch gear is mechanically operated by insulated levers on the lower panels. The rotary panels each include a circuit breaker, a single pole quick break switch, a field ammeter, a main ammeter and rheostat. The total output panel includes an integrating wattmeter and a main ammeter.

The feeder panels are two in number; one controls the live rails on one side of the station and the other the live rails on the other side of the station. The up and down live rails in each case are independently controlled by a knife switch, but one circuit breaker governs both up and down live rails in one direction. The battery booster panels contain the necessary switchgear for operating the booster and the main battery, also the milking booster.

The Track.

Though the system adopted is the third or live rail with track return, augmented by a fourth rail, considerable departure has been made from the previous practice, in that it is a side running contact instead of over or under running. This has been brought about by the fact that 1,200 volts necessitates more adequate protection against shock, and the form of rail adopted is admirably adapted for guarding. This, of course, also applies to the under-running type, but here the objection was the small clearances available.

The live rail and its guarding, also its relative position to the track rails, shown in Figs. 34 and 37, is the invention of Mr. J. A. F. Aspinall, the general manager of the railway company. It is very compact, lies close to the running rail, and gives the maximum space for platelayers and other workmen in the six-foot where the rails are normally fixed. The guarding is of Jarrah, which has been adopted for its non-combustible qualities. It is held in position by clips secured by ordinary chair keys, no screws or nails being used.

The section of the rail has been designed so that its centre of gravity is well within the base line. The rail has been supplied by the Shelton Iron, Steel and Coal Company, Ltd., Stoke-on-Trent, and is of a special design. The arrangement is such that a projection on the upper portion of the insulator acts in conjunction with the guarding as a key which keeps the rail in position. The insulator itself is kept in position by three small brackets. The rail, however, does not rest directly on the porcelain insulator, but a wooden packing is inserted between to act as a buffer. The normal spacing of the insulators is approximately 12 ft. The live rail is anchored every one hundred yards by a

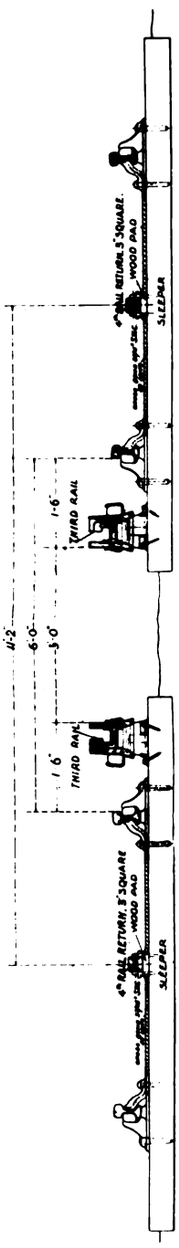


Fig. 34.—Cross Section of Permanent Way Tracks in Relation to the Structure.

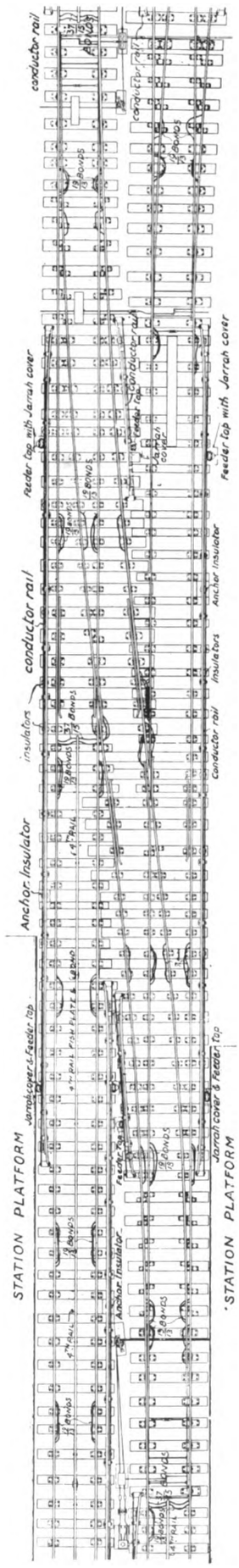


Fig. 35.—Plan of Permanent Way showing Position of Live Rail and Arrangement of Live Rail Ramp.

Digitized by Google

specially-designed anchor insulator supplied by Messrs. Bullers, Limited.

The live rail insulators are of white porcelain, completely vitrified throughout and glazed all over, and are 6⅛ in. high. The actual creeping surface is 8 in. from metal to earth. These insulators have been supplied by Doulton and Company, Limited, of London. The cross sectional area of the rail is 8·35 square inches, and the weight 85 lb. per yard. Its resistance ranges between 6·5 and 7·0 times copper of equal area and length. The normal length of each rail is 60 ft.

The rails are bonded at each joint with two bonds, each bond having an effective cross sectional area of 0·4 square in. These bonds, which are of the strip copper flexible type, have been manufactured by the Forest City Electric Services Supply Company, Limited, of Manchester.

The chemical composition of the rail is :—

Carbon	0·08	per cent.
Phosphorus	0·034	,,
Manganese	0·22	,,
Sulphur	0·026	,,
Silicon	0·022	,,
Iron	99·618	,,

The cables used for connecting across the gaps were manufactured by W. T. Henley's Telegraph Works Company, and normally two 0·5 square in. or a single 1·0 square in. cable are used. They are insulated with vulcanised bitumen and run in wooden troughs, which are filled in with bitumen. These troughs are, as far as possible, carried above ground, as shown on the left of Fig. 33, but in all cases of underground work, "Howard" troughing is used.

The fourth or return rail is of square section with rounded corners, and it weighs 88·5 lb. per yard, with a cross sectional area of 8·84 square in., the chemical composition and electrical conductivity being the same as the live rail. This section has been adopted on account of the small surface exposed over a given volume of rail, therefore needing small maintenance in painting, etc. This rail is cut in lengths of 60 ft., and is placed between the running rails. It rests on wooden pads, 1 in. thick, secured to the sleepers by iron dogs, and is anchored at intervals of 100 yards. There are two bonds per joint, and the effective cross sectional area is 0·325 square in. per bond. They are also cross-bonded every 100 yards to the track rails with cable bonds of 37/15 S.W.G. copper, and the track rails are also bonded by cable bonds. Figs. 32 and 33 show the general appearance of the live rail and its relation to the track.

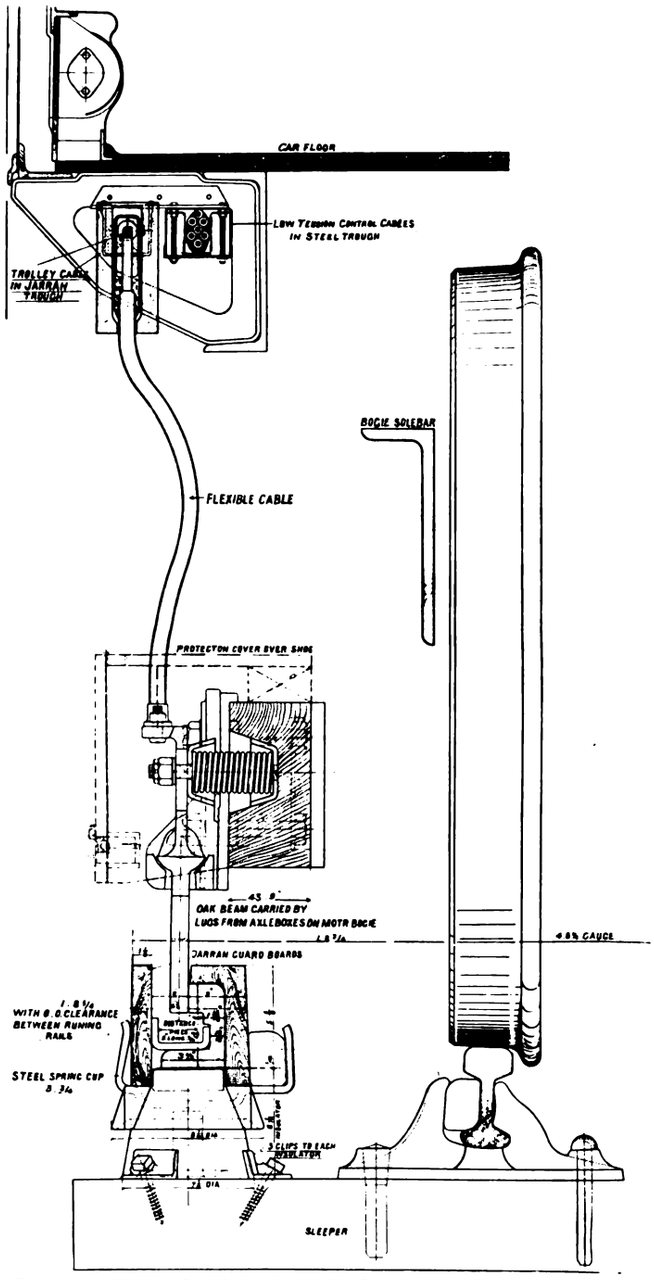


Fig. 37.—Cross Section through Conductor Rail showing the Contact Shoe and Car Trolley Connection.

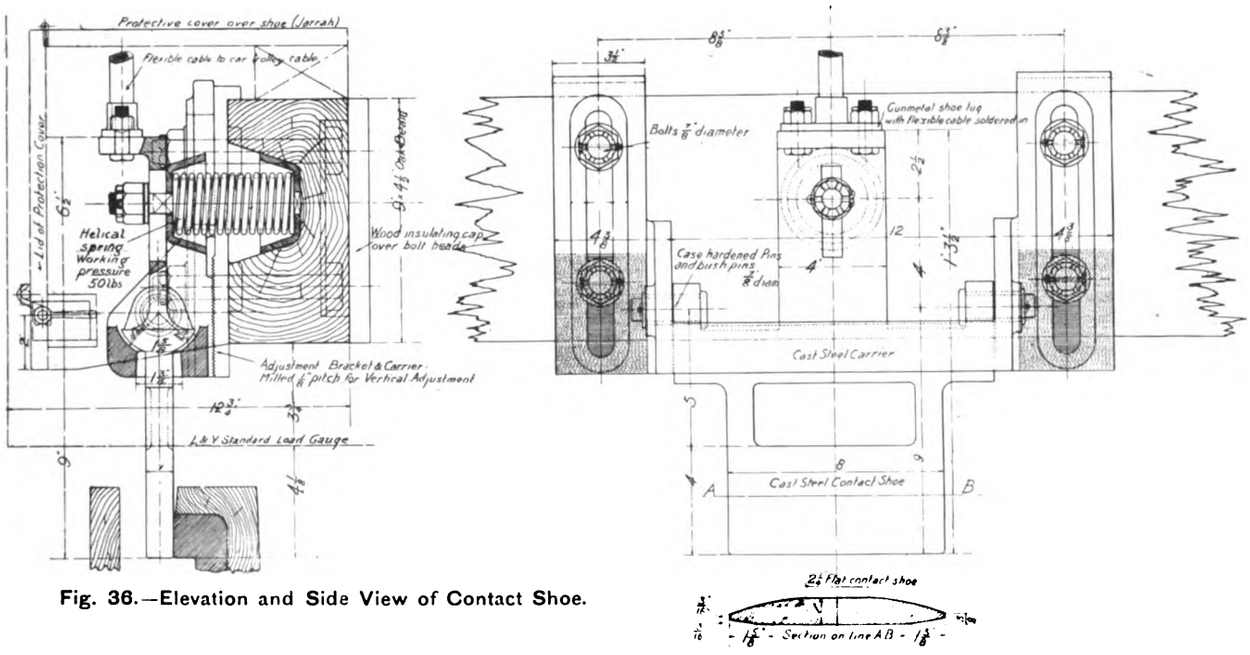


Fig. 36.—Elevation and Side View of Contact Shoe.

Digitized by Google

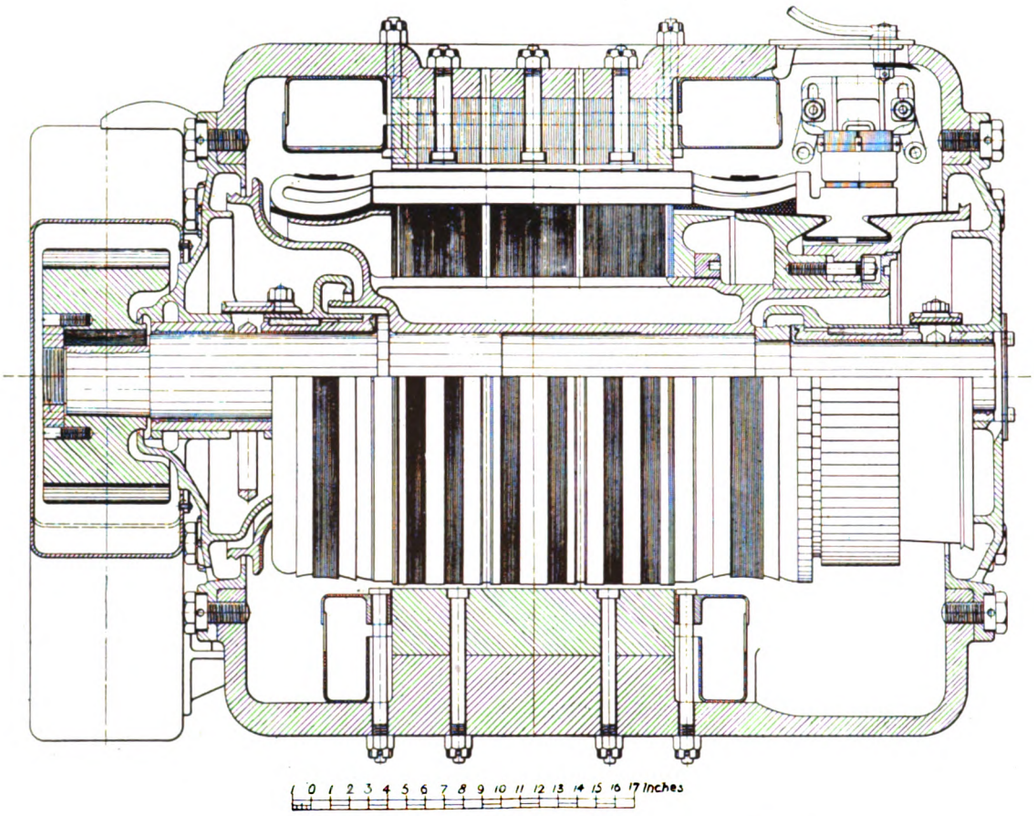


Fig. 41.—Longitudinal Section through 200-H.P. Motor.

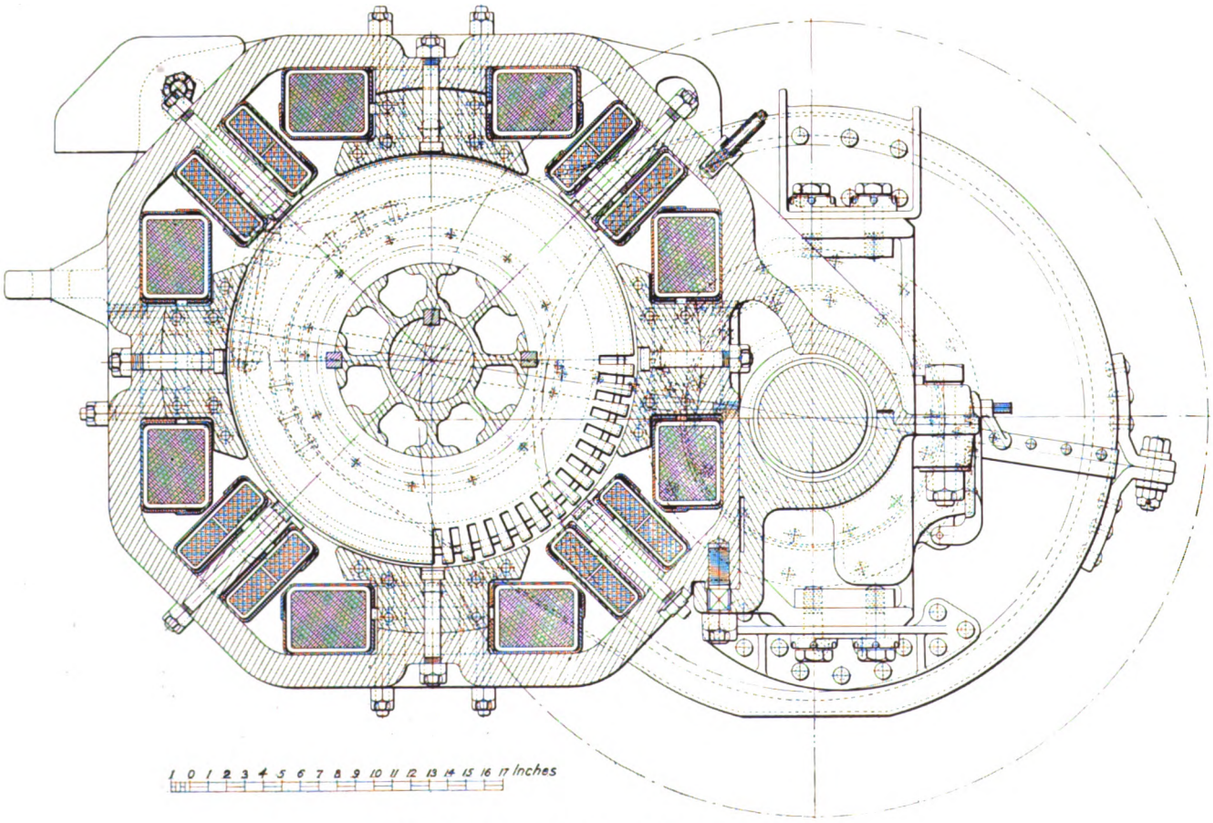


Fig. 42.—Cross Section of 200-H.P. Motor

Digitized by Google

The track is fed from the sub-stations through short feeders, which take the shortest course from the sub-station to the track rails; no supplementary feeders are used. The live rail is divided up into sections, which are connected through section switches placed alongside the live rail, and operated as ordinary hook

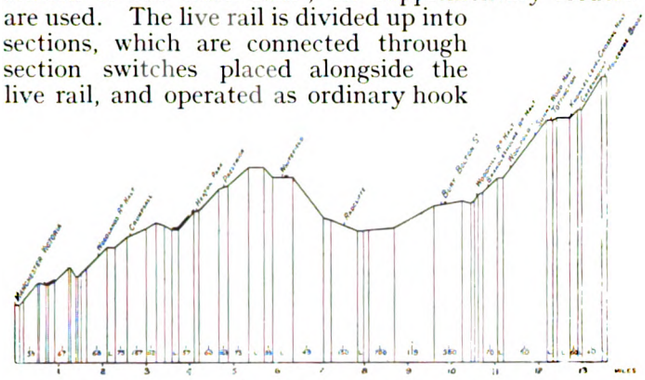


Fig. 39.—Diagram of Gradients between Manchester and Holcombe Brook.

switches. At all gaps the live rail is ramped towards the running rail, so as to receive the shoe which runs on the outside of the rail. This ramp is shown in Figs. 32 and 35. The whole of the erection of the track equipment has been carried out by the railway company.

Motors.—The motors (Figs. 40, 41, 42) are designed for 1,200 volts, series wound, with commutating poles, and are totally enclosed. The field frame is in one piece, of the "box" type, the main poles being arranged vertically and horizontally; this arrangement having been found to give the best space efficiency in the limited room available. The ventilation of the motors has been carefully considered and provided for. The armature laminations are carried on a hollow spider, which also carries the commutator. There is a free passage of air through the spider and through the ventilating gaps in the armature, which are continued through the main poles to the outside atmosphere.

The armature coils are all insulated with solid mica insulation, and the field coils are enclosed in brass cases to keep them from contact with oil. Ring lubrication is used for the armature shaft, the oil wells being of ample proportions; oil lubrication with pads is adopted for the suspension bearings. The brush gear is carried on a solid steel yoke bolted to the frame, which is insulated with solid mica, and forms a very rigid construction.

Electrical Equipment for Cars.

The control equipment on the cars is of the multiple unit system, and is arranged to be operated on the

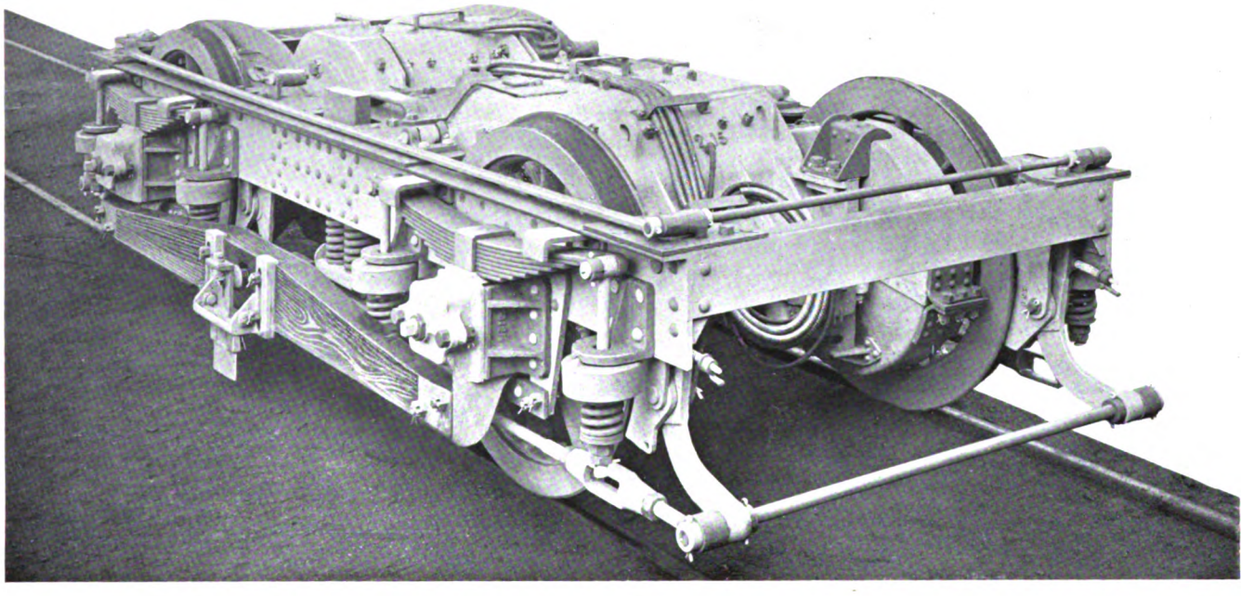


Fig. 38.—Motor Bogie Complete with Motors and Shoe.

Shoe.—The general arrangement of the shoe is shown in Fig. 36, and its connection to the trolley cable in Fig. 37. The mounting of the shoe on the bogie is shown in Fig. 38.

The Rolling Stock.

Motor Bogies.—The motor bogies complete (Fig. 38), which have been designed and built at the railway company's locomotive works at Horwich, carry two 200-H.P. motors mounted and geared to the axle through spur gearing, the ratio being 25/59, or 2·36 to 1·0. On each side of the bogie is mounted a shoe beam, carrying the collecting shoe.

Each motor car is provided with two of these bogies, making a total of four motors, or 800 H.P. per car, the gradients being somewhat severe, as will be gathered from Fig. 39. The wheel base is 9 ft., and the diameter of the wheels 3 ft. 7 in., the wheels being of standard locomotive pattern. There are two brake shoes per wheel.

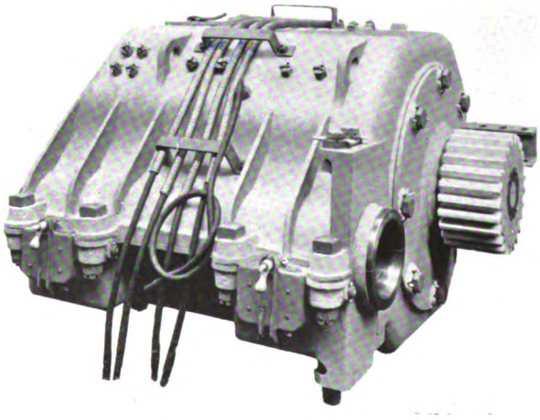


Fig. 40.—200-H.P. Motor.

Digitized by Google

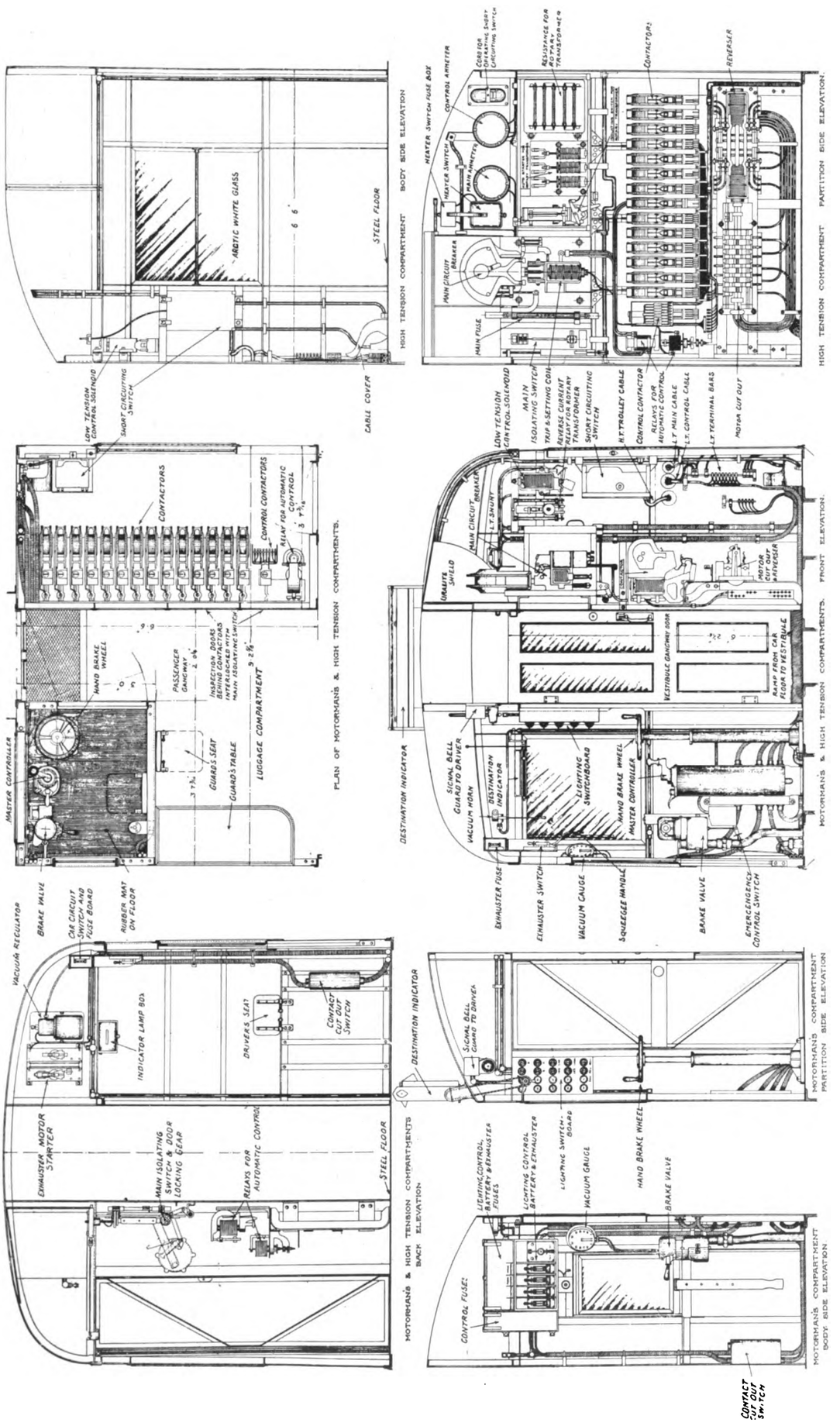


Fig. 43.—Interior of Motorman's and High Tension Compartments.

Digitized by Google

automatic principle, that is, instead of the motorman notching up in the usual way by hand, he puts his controller into the "full series" or "full parallel" position, the various intermediate steps being performed automatically. It can also be operated by hand by simply moving the reversing lever to a certain position. The control equipment on each car is capable of controlling the four 200-H.P. traction motors, with a line voltage of 1,200, to give "series parallel" and "parallel" combinations of the motors.

The whole of the equipment is operated by 100 volts D.C. current, which is transformed from the line voltage (1,200) by means of a rotary transformer mounted under the car. All the 1,200-volt equipment is housed in a special high-tension chamber, the door of which is interlocked so that the isolating switch connecting the control leads from the shoes must be opened before entrance can be effected.

The arrangement of the motorman's compartment, and the high-tension compartment, is shown in Fig. 43. All the contactors, the reverser, and the motor cut-out are mounted on the inner wall of the high tension compartment, opposite the window, and above these are mounted the isolating switch, main fuse, main circuit breaker, and in an auxiliary high-tension chamber is the starting gear for the rotary transformer with its isolating switch. The high-tension wiring is carried in flexible steel tubing.

The motorman's compartment contains a brake valve fitted with an emergency handle which on release applies the brake instantly, and also trips the control circuit, thereby opening all the contactors, a master controller and a hand brake, together with the switches for lighting and the necessary switches and fuses for the control and brake. It also contains the automatic controller and regulator for the vacuum pump. The arrangement shown is the same at each end of the motor car, with the exception of the brake pump controller and regulator.

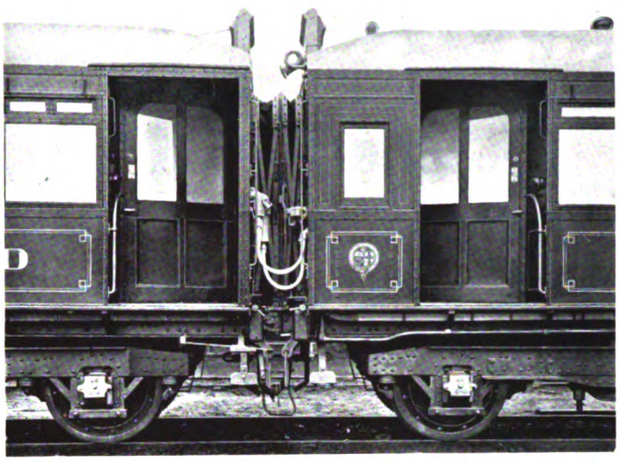


Fig. 45.—Coupling, Vestibule and Side Couplers.

The reverser handle on the master controller has four positions, reading from right to left, "reverse," "off," "ahead automatic control," and "ahead manual control." It will be noticed that one of the positions is "ahead manual control" (Fig. 43). This is used in

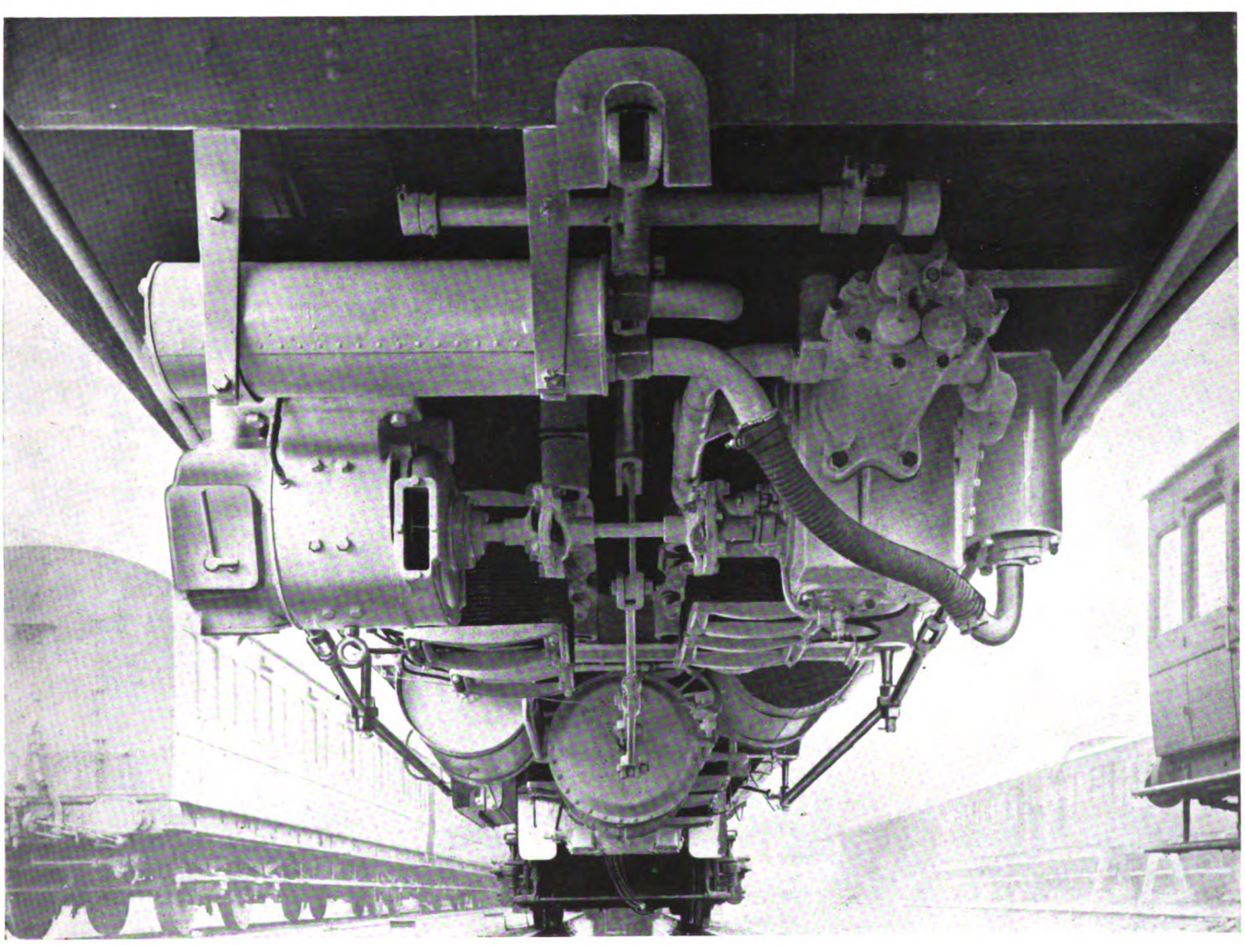


Fig. 44.—Underside of Motor Car.

Digitized by Google

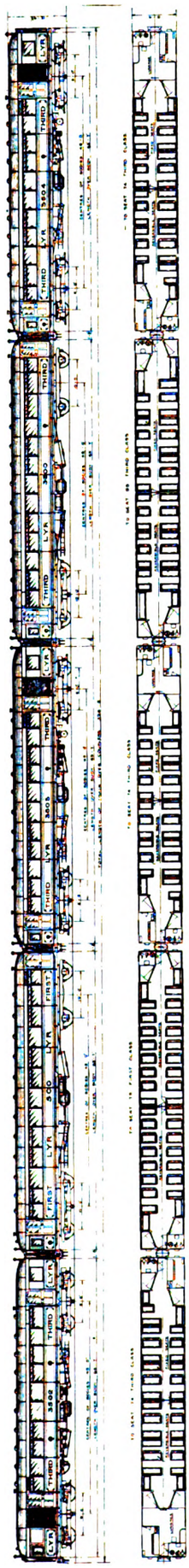
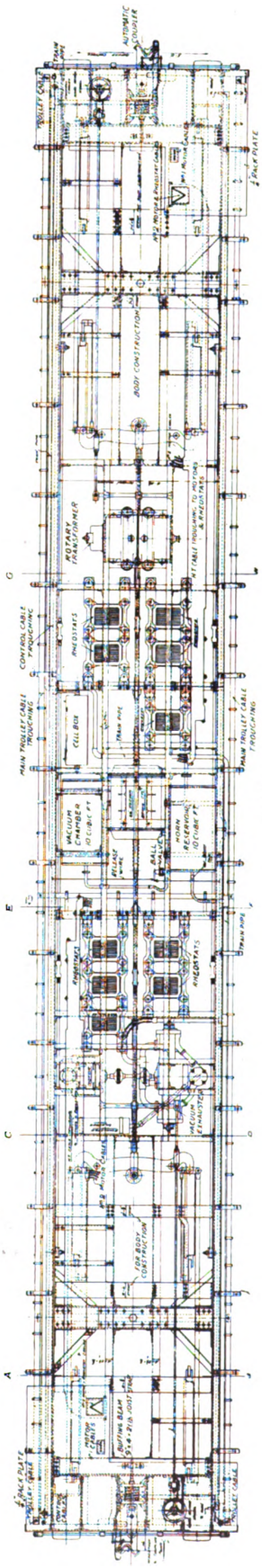


Fig. 46.—Diagram of Five-Car Electric Train.

SIDE ELEVATION.



PLAN.

Fig. 47.—Motor Car Underframe.

Digitized by Google

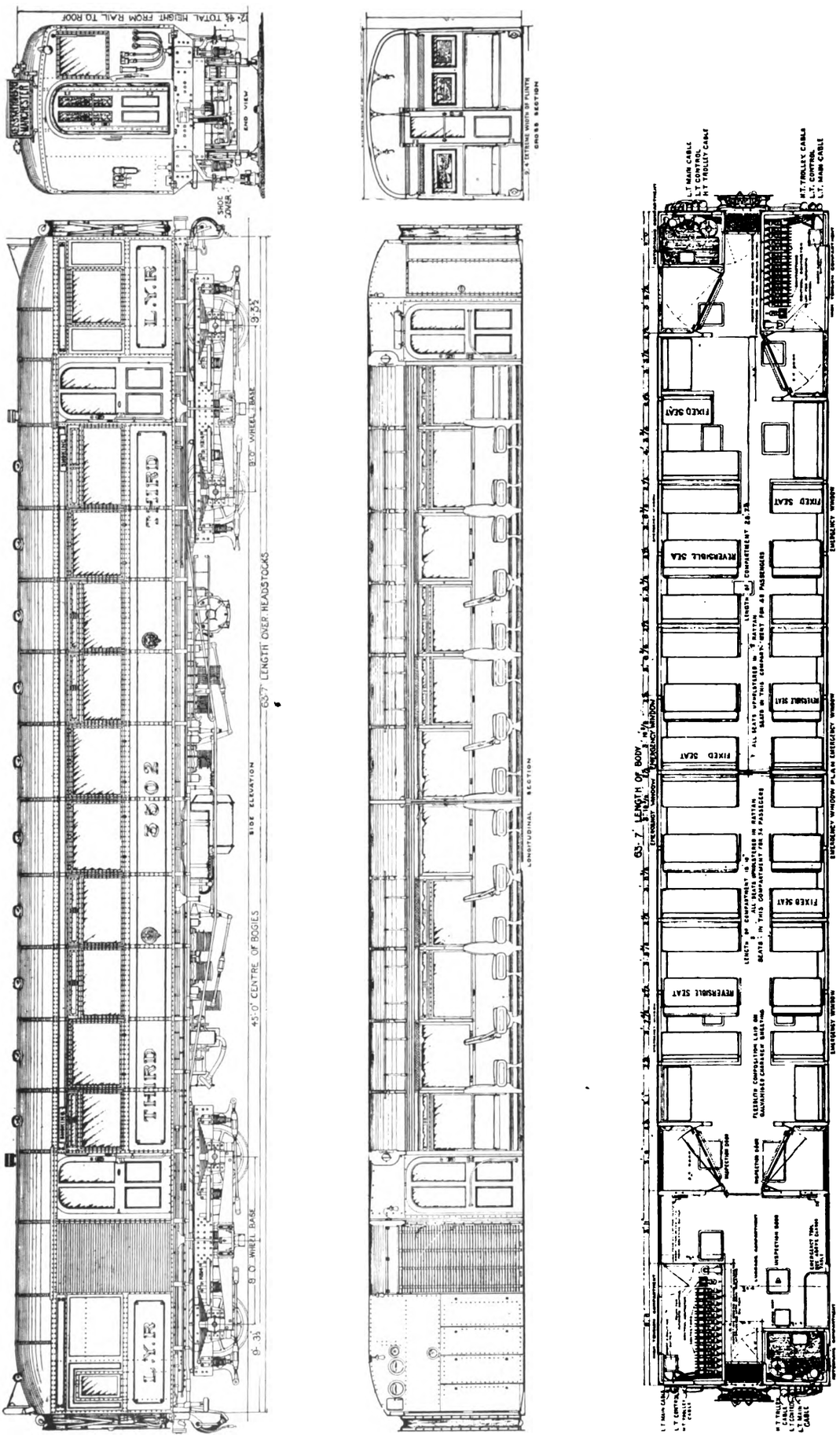


Fig. 48.—General Arrangement of Motor Car.

Digitized by Google

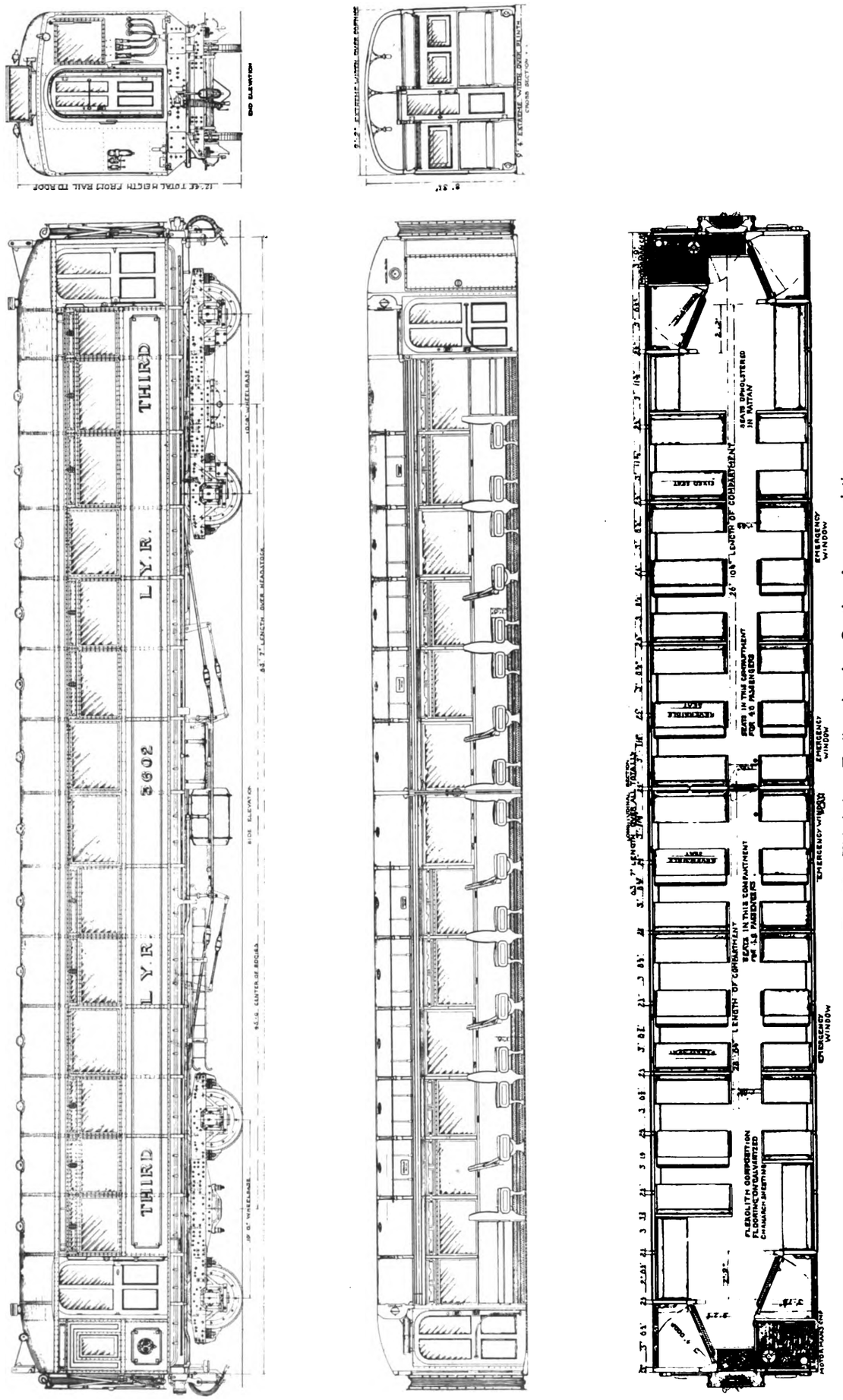


Fig. 49.—Third-class Trailer showing Seating Accommodation.

Digitized by Google

case of emergency due to failure of the "automatic control." Normally this is a stop which is sealed, and which prevents the reverser handle being placed in the manual position.

There are four series points on the controller, three intermediate and three parallel, with an additional two positions by which the field of the motors is shunted when higher speed is required for express traffic. All the cables with the exception of the trolley cable are carried in sheet steel troughs; the trough for the trolley cable is made of "Jarrah."

Each equipment consists of fourteen contactors, which are of the "Hammer" type, with a rolling action, and are fitted with special soapstone dished arc-horns for receiving the arcs. The control equipment has been supplied by Messrs. Dick, Kerr and Company, Limited.

Brake.—The brake is the standard automatic vacuum brake, so that if necessary ordinary steam trail cars can be coupled to them, the brake still being effective.

The vacuum is produced by means of a twin-cylinder exhauster, driven through gearing by a Mather and Platt 5-H.P. 100-volt motor. This arrangement is shown in Fig. 44, which also shows the brake cylinders and the resistances. In arranging the apparatus underneath the car, careful consideration has been given to accessibility for maintenance purposes. The heating is operated off the 1,200-volt circuit, and the lighting, pump motor, and control off the 100-volt circuit. The trolley cables, of which there are two, one on each side of the car, are continuous throughout the trains, connections being made through couplers, as shown in Fig. 45. This figure also shows the multiple couplers for the control and the coupler for the bell and brake exhauster control.

each end of all cars, which enables the trains to be made up to any accommodation required with the minimum of shunting operations.

Figs. 46 and 56 show a five-car train; Fig. 47 shows the underframe, Fig. 48 the general arrangement of a motor car, and Fig. 51 an outside view; and Figs. 55 and 49 an outside view of a first-class trailer, and the general arrangement of a third-class trailer respectively. The bogie for the trailer is shown in Figs. 50 and 51.

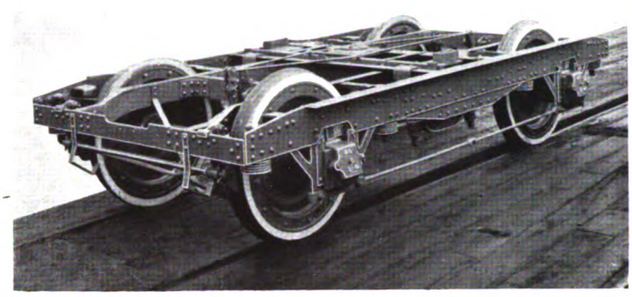


Fig. 50.—Trailer Car Bogie.

From a public point of view the most interesting feature is that timber has been entirely superseded by metal in the construction of these cars, the vehicles being therefore entirely fireproof. The framework is of steel, the panelling of the sides and roof is made up of aluminium sheets, the interior work being finished with mouldings of drawn steel and aluminium sections. The net rod brackets, air extractors and electrical fittings, together with all inside furniture of both

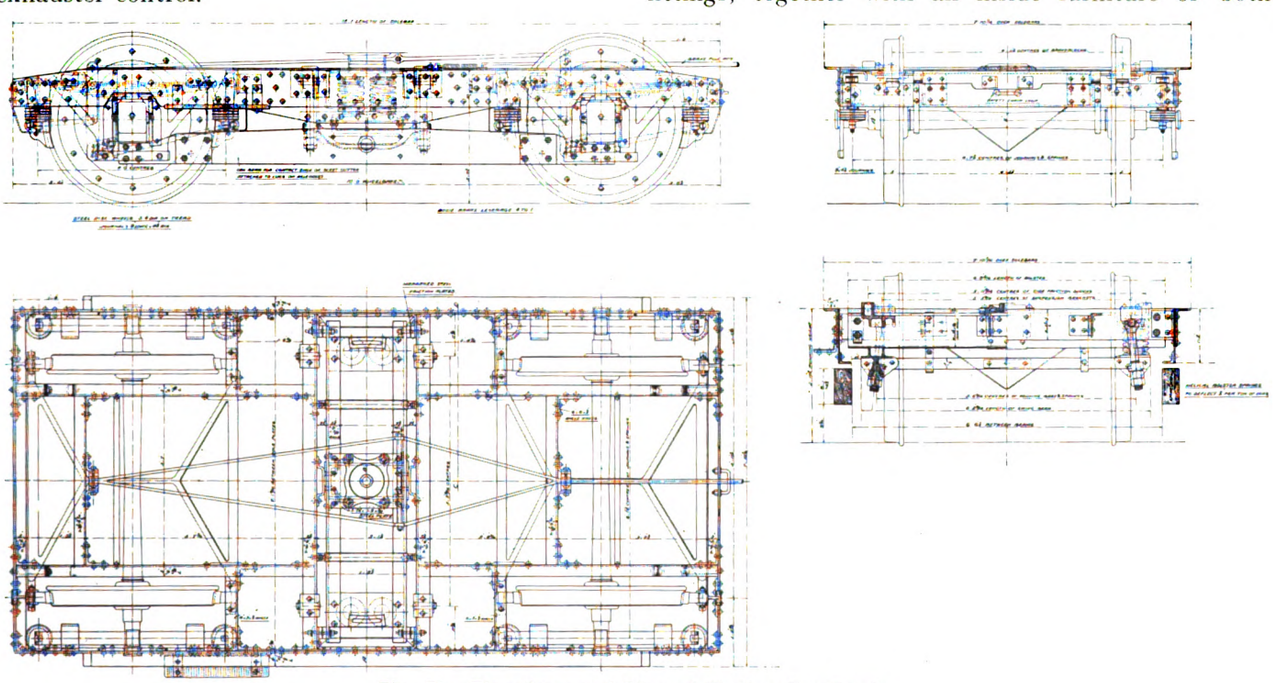


Fig. 51.—Elevations and Plan of Trailer Car Bogie.

All-Metal Rolling Stock.

The electric trains for this service have been built at the company's carriage and wagon works at Newton Heath, and consist of either two, three, four, or five bogie cars, according to the requirements of traffic; but the standard train will have five cars, the front, centre, and rear vehicles being third-class motor cars, and the intermediate vehicles first and third class trailers. A feature of the design is that the compartment for the accommodation of the driver is at

first and third class cars being in polished aluminium. The doors are of steel and of the simplest design.

The all-metal car has largely been introduced in America, and to some extent in this country, but hitherto the term has been somewhat of a misnomer, as timber has been largely used for windows, seats, packings, and other fittings. It is therefore a point of some importance that the new cars on the Manchester and Bury electric line will actually be fireproof.

Digitized by Google

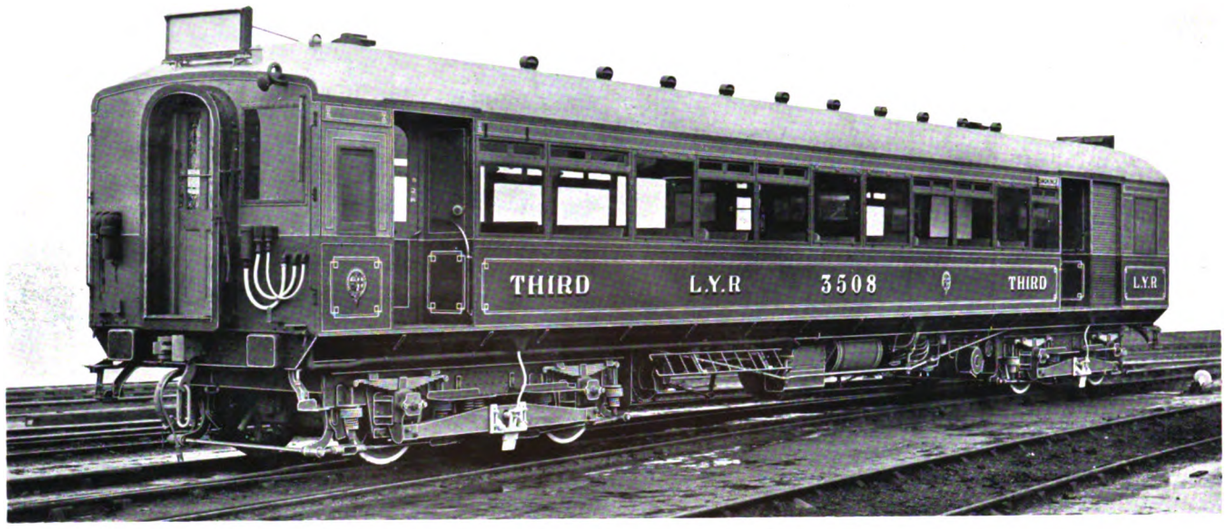


Fig. 51.—A Motor Car.

Fig. 52.—Interior of First-class Car.

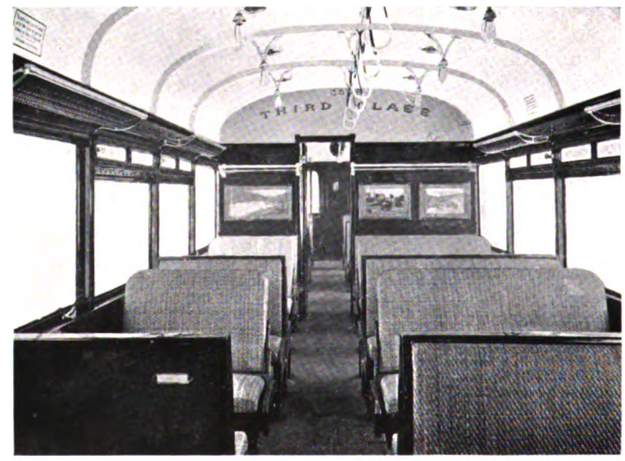


Fig. 53.—Interior of Third-class Motor Car.

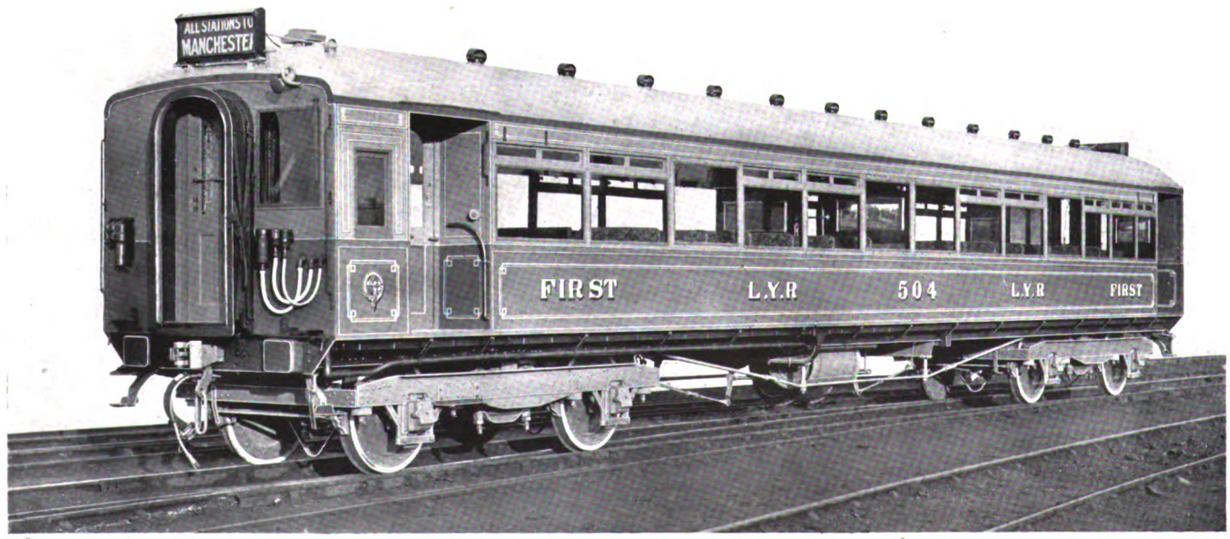


Fig. 55.—First-class Trailer Car.

Digitized by Google

The following are particulars of both the motor and trail cars :—

Total length of five-car train (over all) ...	326 ft. 3 in.
Seating accommodation of five-car train :—First-class, 72 ; third-class, 317 ... ... total... ...	389
Length over body	63 ft. 7 in.
Length over couplers	65 ft. 3 in.
Height ftom rail to top of roof	12 ft. 4½ in.
Centre to centre of bogies	45 ft. 0 in.
Wheel-base of motor car bogies	9 ft. 0 in.
Wheel-base of trail car bogies	10 ft. 0 in.
Total weight of five-car train	220 tons.
Weight of motor car	54 tons.
Weight of trail car	29 tons.

The vehicles have been designed with a slight taper on the sides of the bodies, and with elliptical roofs, the cars having large side lights and fan lights. The flooring has been built up of Keystone or Chanarch galvanised sheets, which are rivetted to the steel underframe, and on these sheets is laid Flexolith or Decolite composition.

The cars are entered at the extreme ends of each vehicle, through vestibules, while gangways are provided throughout the trains so that passengers can pass from one car to another to secure a seat. A feature of note is that the usual stepboard used on most British trains is dispensed with, and passengers will be able to enter the vehicles direct from the station platform without making the usual intermediate step, which will be a decided advantage in quickening the ingress and egress of passengers at the stations.

Each car is divided into two main passenger compartments with a centre aisle, fixed and reversible seats being arranged alternately on either side ; the first-class seats being upholstered in tapestry and the third-class in rattan (Figs. 52 and 53).

Other interior fittings of importance are the arrangement of electric lighting and heating. The former gives an excellent distribution of light and the latter, arranged in ducts along each side of the car at the floor level, ensures comfort in the coldest weather. Electric fans are also fitted, and by means of a two-way switch they can supply fresh air from the outside, or extract foul air from the inside of the car. Sanitary strap hangers, for rush periods, are provided in the third-class cars, and are secured to the roof by aluminium brackets. The painting of the outside of the cars is in the standard colours of the company, whilst the interior is finished in self colours, the lower part in dark brown, from the waist panels to the cornice in a restful shade of green, and the roof being of white. Large panorama photographs of places of interest complete the artistic effect of the inside decoration.

Fig. 56.—Five-Car Train on 1,200 Volt Direct-Current Section of the Lancashire and Yorkshire Railway.

UNDERGROUND AND OMNIBUS COMPANIES.

In accordance with the power obtained last session under the London Electric Railways Facilities Bill, the directors have published the particulars of a proposed pooling agreement, under which the surplus earnings of each of the contracting parties will be paid into a common fund each half-year, to be distributed in the following proportions :—City and South London, 6 per cent.; Central London, 20 per cent.; London Electric, 30 per cent.; Metropolitan District, 12 per cent.; London General Omnibus, 32 per cent.

In each case the surplus will be the earnings remaining after payment of all prior charges, including interest on preference stocks and making due allowance for depreciation and reserve.

Every pooling agreement made under the Bill must be deposited with the Board of Trade, and if the Board of Trade so order must be published in such manner as the Board may direct.

Digitized by Google

THE
Tramway AND Railway World

FOUNDED IN 1892 AND PUBLISHED BY
THE TRAMWAY AND RAILWAY WORLD PUBLISHING COMPANY, LIMITED,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

SUBSCRIPTION:

THE TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum

THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

FOR ALL PLACES ABROAD—Thirty Shillings per annum.

THE EDITORIAL AND PUBLISHING OFFICES OF
THE TRAMWAY AND RAILWAY WORLD
ARE AT AMBERLEY HOUSE, NORFOLK STREET,
LONDON, W.C.

Telegraphic Address: "TRAMIGRO, LONDON."
Telephone No.: GERRARD *2948.*

LONDON, JANUARY 13, 1916.

First 1,200-Volt Railway in England.

Nearly fourteen years ago there was published in these pages a description of the electrification of the Liverpool and Southport line of the Lancashire and Yorkshire Railway, the completion of which made the year 1904 memorable in the annals of British railways. That undertaking was the first example of the application of electric traction to high speed railway passenger train service in the United Kingdom, and from the commencement of the electric service it proved so successful that the railway company were led subsequently to make various extensions. In this issue, by the courtesy of Mr. Aspinall, general manager of the Lancashire and Yorkshire Railway, we are enabled to present a detailed and fully-illustrated account of the latest enterprise of the Lancashire and Yorkshire Railway. This consists of the equipment on the 1,200-volt direct-current system of the line from Manchester to Bury. With the exception of a short experimental line, this is the first railway in the United Kingdom to be worked by direct current at a higher pressure than 600 volts, and it is consequently of exceptional interest. Moreover, the 1,200-volt tension used is probably as high as would be allowed in this country on a third rail conductor. If recourse is made to higher pressure it will be necessary to use overhead wire conductors such as the London, Brighton and South Coast Railway and the Midland Railway employ at Heysham. As it is, the third rail conductor, which has been specially designed by Mr. Aspinall, is so protected by wood as to render accidents to railway servants practically impossible. While there is nothing specially novel in the general arrangements of the Manchester-Bury section, the details have been admirably worked out. In the new power station energy is produced by two three-phase turbo-alternators at a pressure of 6,600 volts, and it is transmitted to sub-stations where, by means of transformers and converters, it is changed to direct current at 1,200 volts, and thence sent out to the conductor rails. The novelty begins with the rotary converters, which produce current at double the pressure ordinarily used for electric railways. Doubling the pressure permits fewer sub-stations, and effects a saving in copper in the low-tension feeders. The train motors are specially designed for 1,200-volt current. There can be no doubt that the great advantages, which have recently been demonstrated in the United States, of the high-tension direct-current system will be speedily realised on the Manchester-Bury line. It is interesting to note that Messrs. Dick, Kerr and Company, who were the principal contractors for the equipment of the Liverpool to Southport section, have been closely associated with the latest electrical enterprise of the Lancashire and Yorkshire Railway. The experimental 3,500-volt line, with overhead conductors, on the Bury to Holcombe section, was designed and constructed by this firm, and on the Manchester to Bury section Messrs. Dick, Kerr and Company have been responsible for much of the plant, especially that required for the high-tension direct current, including the train control system. It should be observed that as the 5-car train used has three motor cars, and each of the latter has four 200-horse-power motors, the total power per train is no less than 2,400 horse-power. This corresponds very closely with the power supplied for the electric trains on the London and South Western and the London and North Western Railways, considering the number of cars forming a train unit in each case. Finally, it may be mentioned that the new rolling stock has been

Digitized by Google

manufactured entirely of steel and aluminium, no wood entering into the construction. This is, we believe, the first example of the use in this country of all-metal cars for main line railways.

Difficulties of the Past Year. The main difficulties of the past year in connection with tramway administration have been associated with labour problems, though not in the sense usually attached to that term. With a few exceptions —one of them notable, however—tramway undertakings have since the war began been free from the evils of strikes. The difficulty that has confronted them, and still confronts them in growing measure, has been the maintenance of a sufficient supply of labour. In common with the other industries of the country, staffs have been seriously depleted by the large numbers of men enlisting in the Army. On the one hand it has been impossible in some cases to maintain the usual car services owing to the scarcity of drivers and conductors ; on the other hand, skilled men have been called away from the repair shops to such an extent that it has been practically impossible to carry on satisfactorily the absolutely necessary work of maintenance and repairs. On the other side of the balance has been found a great increase in tramway traffic. Instead of the business falling away, the number of passengers has gone up enormously. In addition to the increase in the ordinary passenger business, special demands have arisen for the conveyance to and from their work of huge and ever-growing numbers of people employed in munition factories. This part at least of tramway work must be regarded as of national importance, because without the tramway services the production of munitions of war would be seriously hindered. In the face of all these things, hearty congratulations are due to tramway managers, committees, and directors on the success with which they have grappled with the situation. The work that has been done by the tramways of the United Kingdom during the past year is a matter not only for satisfaction but for pride to all concerned. The big innovation has, of course, been the introduction of women as car conductors and cleaners. On the whole they are performing their duties well, and they have enabled services to be continued which otherwise would have been curtailed. The representations made to the Government against the further depletion of repair shop staffs have at last been successful, for on the 4th inst. in the House of Commons an amendment was inserted in the Munitions of War (Amendment) Bill declaring that the supply of tramway facilities, when certified by the Minister, is munitions work. This ought to prevent many difficulties, and may be regarded as a triumph for the tramway authorities. We repeat our congratulations to them. Short of men, short therefore of cars, hampered by the darkened streets, pressed by the demand of ever-increasing numbers of passengers, managers have done wonders. And they will continue. The tramways are not merely serving their local public ; they are serving the nation.

The Problem of the Future. Anyone who has had dealings with trade unions will be only too well acquainted with their characteristic reply to the statement that a certain concession must, if granted, turn a profitable business into a losing one. " You can pass it on to the consumer " is the recognised method of outflanking the difficulty. But even in ordinary trade it is not always possible to make the buyer pay for an increase in the cost of production. The consumer may be able to procure a substitute, imported or otherwise ; or he may go without. In the case of the tramway industry, however, this facile evasion is altogether out of the question. Tramway fares cannot, like the price of bread, be adjusted by minor amounts to correspond with fluctuations in the cost of the service. The only possible means of making such adjustments is by modifying the stages—a method which is attractive in theory alone. An alteration in stages results in a serious disturbance of the service and a good deal of irritation among the travelling public. Moreover, regular passengers seem to have got into the habit of spending so much each day on tramway travel ; and when stages are shortened the change is met by walking the extra distance, not by paying an additional fare for the usual journey. Similar results follow when stages are maintained and the fares increased. Many

Digitized by Google

tramway managers, in fact, hold that every attempt to increase the cost of travel defeats its own end by reducing the balance on profit and loss account. Their view is that the present standard must be maintained, and that the only way of meeting an increase in working costs is to effect economies in other directions or to find some means of augmenting the traffic. In some cases this policy is dictated by circumstances. Most of the tramway companies in this country are bound by statutory obligations to charge certain fares for certain stages. These obligations are embodied either in Acts of Parliament or in agreements with local authorities. We know of no other industry which is equally bound to sell its commodity—in this case the facility of travel—at a fixed price, while that industry remains susceptible to all the influences that arise in other industries to increase the cost of labour and materials. This is a situation that surely demands the most serious consideration. Tramway managers at present are fully occupied by the problem of securing enough labour, male or female, to maintain their services. They are making the best of war bonuses and inflated prices of materials, in the hope that these disabilities will be modified after the war is over. While it is possible or even probable that materials will become cheaper when the country reverts to its normal business, there is little chance that wages will be allowed to fall. The tramway industry must be prepared to face a permanent increase in its costs of operation. Many of the larger municipal undertakings may be in a position to face this increase, but there are others which, like the majority of tramway companies, are working on so narrow a margin that they will not be able to show a profit. One is reluctant to admit that there is no remedy for such a prospect. The tramway companies, at any rate, have a clear case for the mitigation of many of the special burdens placed upon them by agreements made with local authorities in happier days. Parliamentary authority will be needed to bring about the change; and it might be obtained as the result of strong united effort. There is no valid reason why these old agreements should be treated as sacro sanct; and it would be a simple enough measure to bring them up before a body like the Light Railway Commission (at present out of work) for revision in the light of present and prospective conditions. In any case, if the tramway industry does not urge its claims, and urge them vigorously, it will have no cause for complaint if these claims are ignored.

TRAMWAYMEN DECLARED MUNITION WORKERS.

An amendment of much importance to tramway undertakings was, on January 4 in the House of Commons, inserted in the Munitions of War (Amendment) Bill, which was being considered on report. Clause 7 extends the definition of munitions work as contained in the original Act, and sets out various classes of work that are declared to be munition work. Before the Christmas recess the late Sir George Scott Robertson had given notice of an amendment to include in the extended definition "the supply of tramway facilities." In the interval the honourable Member died. On the amendment being reached, on January 4, Mr. Lloyd George, Minister of Munitions, moved the amendment himself, and it was at once agreed to.

Paragraph (*c*) of the extended definition of munitions work therefore now reads as follows:—"The supply of light, water, or power, or the supply of tramways facilities in cases where the Minister of Munitions certifies that such supply is of importance for the purpose of carrying on munitions work, and the erection of buildings, machinery, and plant required for such supply."

In response to an appeal by Mr. Harris, the Minister of Munitions promised to consider whether he could include omnibus facilities in the amendment.

EXCESS PASSENGERS AT LIVERPOOL.

At Liverpool, which was the first provincial city in Great Britain to obtain powers from the Board of Trade to permit excess passengers to stand in the lower saloon, the tramways department has always utilised the privilege in the rush hours. Nine is the limit at present allowed, and this number, added to 64, the seating capacity of Liverpool's standard cars, makes a maximum of 73, which, in the opinion of the general manager, is as many as one conductor is capable of handling.

THE LIABILITY TO PRODUCE TICKETS.

ANOTHER USEFUL DECISION.

Bath Electric Tramways Company on December 30 summoned a lady passenger for refusing to give up her ticket when required to do so by an inspector, or alternatively to pay the fare.

Mr. W. F. Long, the company's solicitor, said the defendant told the inspector that she was nearly at the end of her journey and had thrown the ticket away. She appealed to the conductor, who said she had paid. From the point of view of the company that was not sufficient. The by-law stated that a passenger should on demand produce his or her ticket or, as an alternative, pay the fare. There had been a case on the same point decided in the High Court. Where a person lost his or her ticket and paid over again, the company were willing to refund the extra money. Defendant had since apologised, and paid the expenses. The company, therefore, asked for the dismissal of the summons, being satisfied with the apology and the attention drawn to the by-law.

Digitized by Google

GOVAN DEPOT OF GLASGOW CORPORATION TRAMWAYS.

The new car shed that has been erected on the south side of the Clyde for the Glasgow Corporation Tramways and was opened early in September, takes the place of an old horse-car shed which in 1901 was converted for the accommodation of electric cars. This old shed, however, had become much too small for the requirements of the growing traffic. An eminently suitable plot of ground for the new premises was, fortunately, available in the neighbourhood of the old shed, so that there was no inconvenience caused to the traffic arrangements or to the staff working in that district. The ground purchased for the new shed extends to 18,270 square yards, including streets. The net ground covered by the buildings and courtyard measures 9,416 square yards. The price paid was fourteen shillings per square yard.

View of Govan Depot from the street.

View of Offices from the yard.

In designing the buildings, considerable attention was paid to the offices, stores, workshop, kitchen, and other accommodation for the staff. On the ground floor of the administrative block there is, first of all, the general office measuring 35 ft. by 38 ft. 6 in.; next comes the entrance hall for the upper floor, also cloak-room, etc. The men's billiard-room has accommodation for two tables, and measures 37 ft. by 26 ft. It may be stated that at all the depots the men provide themselves with billiard tables, the Corporation simply providing the premises.

The kitchen measures 35 ft. by 24 ft. In this room there is a hot-plate heated by gas, also two hot-water kettles, for the use of the night staff. Lavatory and water-closet accommodation is large, and is of ample dimensions for the whole staff. There are also two bath-rooms for the men's use. The whole of the walls are of white enamelled brick.

The fitters' shop and foreman's store measures 34 ft. by 35 ft., and at the end of the block is the

Car Shed at Govan Depot—Glasgow Corporation Tramways.

Digitized by Google

cleaners' store, each man having a separate locker made of sheet-iron, with expanded metal door.

It was necessary to make the administrative block of two storeys, on account of the elevation to Harvey Street. On the upper floor is the recreation-room for the staff, which includes a concert hall, capable of accommodating 400 people, with all the necessary ante-rooms.

Depot Office.

The car shed proper has accommodation for about 140 cars. It has an open steel roof, the main couples having 10 ft. centres carried on a lattice girder which runs the whole length of the car shed. The cleaners' gangways are carried on cast-iron columns which are set in a concrete floor. Between the car shed and the administrative block there is an open court measuring 80 ft. by 190 ft. The total cost of the car shed, including ground, amounts to £46,000.

For the description of the new depot and the accompanying photographs we are indebted to Mr. J. Dalrymple, general manager of Glasgow Corporation Tramways.

MELBOURNE RAILWAYS ELECTRIFICATION.

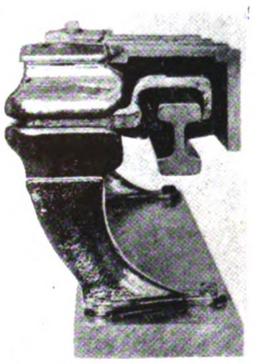
ARRANGEMENTS FOR TRAINING THE OPERATING STAFF.

The Victorian Railway Commissioners have made the following appointments in connection with the installation of automatic signalling on the suburban railways now in course of electrification. Mr. G. H. Wion, Pennsylvania Railroad Company, assistant signal engineer for five years from July, 1914; Mr. C. W. Prescott, London Underground Railways, transferred to the service of the Commissioners for three years from February, 1915; Mr. T. Kittredge, from the United States, track circuit designer draughtsman, for three years; Mr. W. J. Huggins, assistant inspector of signals and telegraphs, Metropolitan Railway, signal foreman and instructor of fitters, for five years from December, 1914.

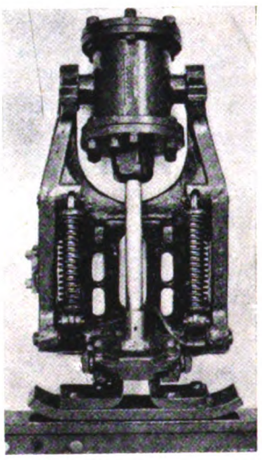
Mr. J. Rist, Central London Railway, has been engaged for training motormen, guards, and other employees. The school of instruction is at the Flinders Street Station, Melbourne, and the actual driving lessons were to be given on the Flemington racecourse line as soon as power was forthcoming from the Newport generating station. The guards and shunting staff, as well as the motormen, are being trained in the work of driving. Thus a guard will be able to take charge of a train in case of an emergency. The adoption of electric traction will bring about a great diminution in the amount of shunting, and the work of the shunters will be comparatively light. Neither the guards nor the shunters will undergo so extensive a course of technical study as the motormen, whose training will enable them to remedy defects that may develop during running. The chief mechanical engineer is to have the direction of the motormen, and the general superintendent of transportation is to retain the control of the guards.

CONDUCTORS AND COLLECTORS FOR ELECTRIC RAILWAYS.

Mr. C. J. Hixson, in a paper read before the American Association of Railway Electrical Engineers on contact conductors and collectors for electric railways, gave a general classification of the different types of device for collecting current from third and fourth rails. In describing some tests made about a year ago Mr. Hixson says that it was found desirable in connection with the use of 2,400 volts for an over-running type of third rail some times to increase the horizontal distance



Third Rail Protection for High Voltage.



Contact Shoe Operated by Compressed Air.

of the third rail from the contact rail by, approximately, 4 in. The third rail shoe used for current of this comparatively high voltage is of a special design, and the slipper with its supporting arm is raised and lowered by compressed air, as shown in accompanying illustration. The contact arm can be raised up against the side of the car so as not to project and be a source of danger. When this is done, the energy is supplied through a slider pantograph.

LIVERPOOL OVERHEAD RAILWAY.

A paper on the history of the Liverpool Overhead Railway was submitted to the Liverpool Engineering Society on December 7 by Mr. E. J. Neachell, the general manager and engineer. Mr. Neachell stated that there are 200 trains in each direction, giving an average headway of 5¾ min., but during the times of heaviest traffic (6.30 to 7.30 a.m. and between 5 and 6 p.m.) the interval between trains is only 3 min. In the evenings and on Sundays a 10 min. service is in operation. During the past five years the average number of train-miles run was 845,765. During 1913, the last complete year before war broke out, when the shipping trade of Liverpool was probably better than it ever had been, the average number of workmen's daily return tickets was 6,700, equivalent to 13,400 passengers —or a total of nearly 4¼ millions in the year. As the dock estate develops northwards, and the larger steamers are transferred to the docks now in course of construction at the Seaforth end, these numbers should not only be maintained but largely increased, and thereby tend to the expansion of the other classes of traffic.

Non-Inflammable Railway Carriages.—In answer to a question in the House of Commons relating to deaths caused by carriages catching fire in a recent railway accident, the President of the Board of Trade stated that some of the principal railway companies were understood to be carrying out the recommendation that coaches should be constructed of steel as far as possible, and that any timber used should be rendered non-inflammable. On the Underground electric railways, on which the rolling stock must be of a type approved by the Board of Trade, the woodwork of the cars had to be non-inflammable. The Board of Trade had no power as regarded ordinary railways to make an order declaring it obligatory that all new railway carriages shall be of non-inflammable material.

Digitized by Google

DEVONPORT TRAMWAYS ARBITRATION.

Mr. B Hall Blyth, sitting at the Surveyors' Institution, Westminster, on December 17, resumed the arbitration relative to the purchase of the Devonport and District Tramways by Plymouth.

Mr. J. W. Sparkes, electrical engineer to West Hartlepool Council, and formerly to Devonport Corporation, had given evidence in support of the Council's case at the last sitting on November 23. He was cross-examined by Mr. Macmillan, K.C., concerning his statement that if the company continued in existence they might expect to have to pay an increased charge for electricity. He now said that the price had been considered on three separate occasions. It was dealt with twice by the Board of Trade and once by a round-table conference. There had been reductions made in the price in each case. The first adjustment fixed the average price at 1·8d. per unit, the second in 1906 fixed it at 1·7d., and in 1911 the amount was reduced to 1·39d. per unit by agreement.

Mr. R. J. Fittall, formerly town clerk of Devonport, and now consulting town clerk for Plymouth, said the company approached Devonport Council in 1906 and 1911 as to through running with Plymouth. In 1912 terms were provisionally arranged, but nothing was done to carry them into effect. As the result of the recent amalgamation of Devonport with Plymouth, he was convinced that the present Council would not have consented to through running with the company. He had formed that opinion by attending meetings of the Tramways Committee.

In cross-examination, witness recalled the rail-motor competition with the tramways. The former was a much quicker service between definite points. The company's period of prosperity had been since the time of that competition in 1905. He agreed that the Devonport Corporation could have enabled the company and Plymouth Corporation to have made arrangements for through running. The terms upon which Devonport would give their consent under the Light Railway Order had been practically concluded, but had not been submitted to Plymouth.

Mr. J. R. Waller, consulting engineer, stated that in making a valuation of the tramways for the Corporation he took the prices ruling at such a period anterior to the date of transfer as would enable the construction and equipment to be carried out by the time of the transfer. He had based the price on figures ruling some 15 months anterior to the date of tranfser. He had taken the agreed figure of £12,000 as being the present value of the cars, which he estimated had an average life of 11·7 years. The gross profits from October 2, 1915, to August 12, 1919, he put at £15,514, and the net profits at £11,703. He looked for an increase of one-third in the number of passengers in the event of through running.

Cross-examined, witness admitted that he would not be able to get a tramway constructed just now. Asked why a good price should not be given for a tramway ready made at this period of the war, witness said that when counsel fixed a good price he saw no reason why he should stop at the figure he claimed. The reason why witness had made deductions in respect of extra expenses on cables on the leased lines was that they were not well maintained. The owned lines were well kept up. He contended that his figures of 33½ per cent. increase, which he had allowed for through running, was a very large allowance.

The proceedings terminated on December 20, when counsel made their final speeches. Before they did so the arbitrator said:

"As this is a somewhat complicated case, and as I am anxious that there should be no misunderstanding as to whether or not I have applied my mind to all the points referred to me, I have asked my assessor at this stage to put my award into form, leaving the figures blank. He will to-day hand to the solicitors the draft, which they and counsel will please read over and make any suggestions. After I have given careful consideration to the evidence and the speeches of counsel, I shall fill in the figures. There are one or two points which I shall specially mention just now:—

"1. Counsel for both parties have referred to what they call 'a technical ragged edge.' That is in connection with certain powers under the Light Railway Order. In the draft form of award I merely, when dealing with the light railway, quote the words of the agreement under which I was appointed arbitrator. It may be that parties may wish to add some further words to the draft to show exactly what is the counterpart of the price which I shall fix as the value of the light railway. I am in entire agreement with learned counsel that there should be no 'ragged edge' left about this matter.

"2. I wish to make it clear that I have fully in view what Mr. Lloyd said regarding the point about war-prices. If after consideration I come to the conclusion that I am bound to accept prices quoted under the circumstances dealt with by Mr. Lloyd in his opening speech, and those alone, then I shall find figures and state my award in the form of a special case in order that the opinion of the Court may be taken.

"3. Finally, regarding costs, I suppose the parties are agreed that I am to have full power and jurisdiction to deal with the whole costs as I think fit. In the draft award which is to be handed to the solicitors I have not dealt with costs for the reason that I shall come to no conclusion regarding them until I have the benefit of the views of counsel as to how they shall be disposed of."

IMPORTANT LAW DECISION.

The action of Kitson and Wife v. the Yorkshire (Woollen District) Electric Tramways, Limited—a case somewhat unusual in its facts and of interest as giving a reminder that there is a line beyond which plaintiffs cannot successfully go in alleging negligence against tramway or omnibus proprietors—came before Mr. Justice Atkin and a special jury on December 2 at Leeds Assizes. The claim was in respect of personal injuries sustained by the wife while alighting from a car. The facts proved or admitted were as follow: On Saturday, November 8, 1913, Mrs. Kitson (who was 58 years of age) and her daughter were travelling in a single-decked car in Dewsbury. On arriving at their destination the daughter got off, and then Mrs. Kitson attempted to alight. Being stout, she turned to face the rear window of the car to get off sideways. She put her left hand on the support rail below the window, and her right hand on the top guard bar across the window. The window bar gave way, and she fell into the street, the bar coming away in her hand. She was considerably injured. She admitted that she had been on these cars scores of times, but said it was not obvious to her that the bar was there to guard the window and passengers near it from injury. She had never been warned nor seen any notice not to use it. She alleged she had seen hundreds use it in the same way. There were three rods across the window; below them a grabrail (3 ft. 2 in. from the level of the platform); and the usual upright stanchion at the opposite side of the entrance to assist passengers while mounting or leaving the car, the distance between the grab-rail and stanchion being 2 ft. 2 in. Defendants' counsel submitted that there was no case to go to the jury. The Judge held that there was no evidence of negligence to go to the jury. It appeared quite plain to him that the bars were not provided for the purpose of enabling passengers to use them in passing out of the car, and there certainly was no evidence that the means that were provided, namely, the grabrail and the stanchion, were not adequate for use on mounting and leaving the car. There was no evidence that the car was not provided with reasonably safe means of exit. Plaintiffs said that the company ought to have known that passengers would use these bars, and would throw their weight upon them, and that therefore they ought to so fix the bars that, however heavily a passenger put his weight upon them in ascending or descending, they would not give way. He could not see that there was any evidence that the company might reasonably expect passengers to put their weight upon the bars, nor did he think there was any obligation to accept that as a reasonable use of the car; nor could he agree that in fact they so arranged this car as to constitute a trap. He could not see any evidence of negligence in not so fixing the top bar that it would hold the weight plaintiff put upon it, and he could not see any breach of duty on defendants' part. The case therefore could not go to the jury, and there would be judgment for defendants, with costs. Counsel for plaintiffs were Mr. A. W. Bairstow, K.C., and Mr. R. A. Shepherd, instructed by Mr. C. S. Hays, Heckmondwike; and for defendants Mr. W. J. Waugh, K.C., and Mr. Richard J. Sutcliffe, instructed by Messrs. Dwyer and Son, Dewsbury.

PRIVATE BILLS FOR 1916.

Private Bills to be considered in the forthcoming session show a great falling off in the number deposited, owing to the Treasury restrictions on the spending of money by local authorities. The plans deposited number only 15, as against 158 last year. Railways number 1, against 4 last year; tramways 1 against 10; miscellaneous 5, against 35; provisional orders 9, against 109.

The one tramways Bill is presented by the Metropolitan Electric Tramways Company, who are applying for extension of time for completion of tramway No. 5 authorised by Metropolitan Electric Tramways Act, 1911, and of trolley vehicle equipment authorised by Metropolitan Electric Tramways (Railless Traction) Act, 1913, for purchase of lands under Metropolitan Electric Tramways Act, 1905, for exercise of powers of the Middlesex County Council as to purchase of parts of the undertaking and powers of the company, and for execution of street widenings in Tottenham Urban District; relief for Middlesex County Council in respect of notices to treat for purchase of lands under the Act of 1911.

LIGHT RAILWAYS ACTS, 1896 AND 1912.—ORDERS CONFIRMED.

West Sussex Light Railway Order, 1915, authorising the construction of light railways from Hunston to West Itchenor, West Wittering, and East Wittering, including the reconstruction and working as a light railway of the Selsey Tramway.

Authorising the construction by the Joint Boards of the Urban Councils of Wombwell, Wath, Bolton, and Thurnscoe of light railways from Barnsley to Thurnscoe by way of Stairfoot, Wombwell, Brampton, Wath, and Bolton, with a line to link up with the Mexbro'-to-Rotherham system from Wath. This scheme carries the railways to Bolton by way of Staithes Crossing, Manvers Main, but an amended application will be made to abandon that route and to go to Bolton direct by the road passing the three railway stations.

Digitized by Google

THERMIT RAIL WELDING PATENTS.

QUESTION OF GRANTING A LICENCE.

At the Patents Office, London, on January 5, the Controller General of Patents and Sir Cornelius N. Dalton heard counsel and evidence in an application by the British Thermit Company, Limited, Liverpool, for Orders of the Board of Trade avoiding or suspending certain letters patent connected with welding rail joints. The application was opposed by Thermit Limited, London. Mr. E. R. Royston, patents agent, Liverpool, appeared for the applicants, and Mr. H. A. Colefax, K.C., and Mr. J. Hunter Gray for the opponents.

CASE FOR THE APPLICANTS.

Mr. ROYSTON said that the application was for the avoidance or suspension of eight patents which had reference mainly to the welding of tramway and other rails. The applicants practically consisted of two people, Mr. Blackwell and Mr. Turner, who were applicants in a prior case early last year under which two earlier patents were suspended. Thereafter they formed themselves into a company, which was practically owned by Mr. Blackwell. The company then started to sell thermit, the process in which thermit was used being the subject of the two patents. Thermit itself was open for use by anybody, and the two patents were directed to the use of the material for joining the ends of rails and for similar purposes. One of the chief reasons for the present application was that it was considered by some that the patents now in question were used by Corporations in alumino-thermic joining of the ends of the rails. Corporations had told the applicants that the Thermit Company stated that the thing could not be done without these patents.

Mr. COLEFAX, representing Thermit, Limited, objected to this statement.

Mr. ROYSTON contended, however, that the applicants were under a disability, and they claimed at least to be put into as favourable a position for carrying out the process as the opponent company, who were keen competitors and were doing all they could to keep hold of this business.

The CONTROLLER GENERAL asked if the applicants wanted a licence for the patents.

Mr. ROYSTON.—Yes.

The CONTROLLER GENERAL said that the difficulty which remained was that some of these patents were for improvements in the process and some were for actual apparatus.

Mr. ROYSTON said that if the applicants used any of the patents they would pay the royalty. The simple way would be that every time any of the patents were used in the joining of rail ends, the royalty should be payable at so much per joint. The royalty should be very small, as Thermit, Limited, had a dominating position.

The CONTROLLER GENERAL said that it was another instance of what he saw every day, namely, that although English manufacturers might have had everything in their hands in 1901 he left everything alone, and left a German company to take out a patent every year to develop the process. Then after 15 years the English manufacturer came and said what a dreadful thing it was. Of course it was. It was the same thing that had happened with company after company in the most important industries in this country. But it was no use blaming the German company. They were not fools when they saw the probabilities; the English companies were.

Mr. ROYSTON, in further argument, suggested that the royalty should be 6d. per joint. Proper accounts should be kept to show to what extent the patents were used.

AN OPPONENT'S POINT.

Mr. COLEFAX (for Thermit, Limited) contended that the Controller General had to be satisfied about certain things under the Patents (Temporary Rules) Act, 1914, and he had not heard a word from the other side to satisfy the Controller. One of the rules was that the Controller should be satisfied that the applicant intended to manufacture the patented article or to carry out the patented process. Another was that it was in the general interest of the country or of a section of the community, or of a trade (which did not mean an individual company) that the article should be manufactured or the process carried on. That had no application here. The company that owned these patents was at present carrying on the business under a controller appointed by the Court, and was doing everything that was required in the country. More than that, it was a controlled establishment under the Munitions Act.

The CONTROLLER GENERAL said that the legislation referred to was passed in order to foster English trade, and to set up side by side with German interests in this country purely English undertakings.

Mr. COLEFAX said that according to that anybody could come and say, "Here are some patents owned by an English company, the shareholders of which are Germans. I would like to start in this business; please avoid these patents or give me a licence under them."

The CONTROLLER GENERAL said that he would start with a predisposition in the applicants' favour.

In previous cases of important industries he had always taken the view that even if a German-owned company could carry on the business, it was his duty to recommend the setting up of a purely English venture.

Mr. COLEFAX maintained that that was not the true interpretation of the rule.

Mr. W. L. TURNER, one of the applicants, was then called, and gave evidence bearing out Mr. Royston's statement as to the difficulties with which his company had been met owing to the patents. His company had not yet got an actual staff together for carrying out the welding of rails. They were waiting till they got the patents.

EXPERIMENTAL WORK.

Cross-examined by Mr. COLEFAX, the witness said that his company had not attempted to weld any tramway rails, but they had carried out certain experimental work. They had not tried to get Corporations to employ them to weld rails, but they had sold thermit to Leeds and other Corporations.

Mr. COLEFAX asked a number of questions as to the Corporations who had refused to buy the applicants' thermit on the ground that the existing patents prevented the Corporations from carrying out welding, and pointed out that very few Corporations did such work. The rule was that it was carried out by the workmen of Thermit, Limited.

Witness replied that his company wanted to get the Corporations to do their own welding.

The CONTROLLER GENERAL remarked that he had a desire to see the trade freed. Thermit, Limited, were, however, perfectly entitled to say that the present applicants were not the right people.

Mr. COLEFAX said that the proper course was that any Corporation who wished to do the welding should apply for the suspension of the patents. As a matter of fact, the Corporations did not wish to do the welding. There was no question but that Thermit, Limited, could make thermit far better than anybody else.

In further cross-examination, the witness was pressed to say why he wanted certain of the patents, seeing that they were not necessary for making welds, but he maintained that they might be desirable for the purpose.

EVIDENCE FOR THE OPPONENTS.

Evidence for Thermit, Limited, was then heard.

Mr. ARTHUR TAYLOR said that his firm, Hudson, Smith, Briggs, Smith, and Taylor, chartered accountants, were in October, 1914, appointed by the Board of Trade under the Trading with the Enemy Acts to inspect the books of Thermit, Limited, and investigate that company's affairs. He received every assistance from the officials of the company, especially from Mr. Stutz, the managing director. He found that at the first meeting of the directors after the incorporation of the company in 1904, Mr. Stutz was appointed a committee of one to exercise all the powers of the directors, and those powers he still exercised. Government Departments had been customers of the company. On January 22, 1915, witness was appointed by the Court controller to supervise the conduct of the company's business. That business had been properly and thoroughly managed. After the war began the company set up additional plant. All the materials employed in the manufacture of metal substances and the machinery were wholly British. All the staff were British. About 80 per cent. of the company's output at present had relation to munitions of war. The company had a high reputation for quality.

Mr. J. B. HAMILTON, general manager of Leeds City Tramways, said that in Leeds they had employed thermit in the construction and maintenance of their lines for nearly 13 years. He believed Leeds was the first town in Britain to take it up. The Corporation's workmen did the welding. A very considerable amount of skill was required on the part of the operators. The Corporation only employed for the work, men of long experience and training. In response to a circular from the applicants in the present case, the Corporation bought some British thermit. Three welding operations were carried out with it and they produced very bad joints. One went to pieces before it could be tested properly. With the second, they got deflections of one-sixteenth at 25 and 30 tons' pressure with supports 3 ft. apart. With the third, they got deflections of one-sixteenth at 10 tons, and it broke at 15 tons. The thermit joint, in his department's view, was not satisfactory unless it stood a pressure of 80 or 90 tons. Thus for tramway welding the British company's thermit was no use at all. A number of other Corporations had tried to carry out welding themselves, but probably because they had not the trained experience they had adopted the method of getting the whole operation done by Thermit, Limited. Leeds Corporation used some of the patents to which the present application related. The payments to Thermit, Limited, included the right to apply any of the patents if the Corporation chose to hire the appliances.

Argument of the case was resumed.

QUESTION CONFINED TO LICENCE.

Mr. COLEFAX said that he wished to know which course was being pressed by the applicants—avoidance of the patents, or the granting of a licence. He submitted that no case had been made for avoidance.

The CONTROLLER GENERAL said that Mr. Colefax might take it that unless Mr. Royston made out a case for avoidance, as distinguished from suspension and an ordinary licence, the tribunal would not deal at all in their report with the question of avoidance.

Digitized by Google

Mr. ROYSTON.—I shall not ask you to do that.

Mr. COLEFAX then proceeded to contend that there was no case for a licence. The royalty suggested of 6d. per joint was absurd, as 5 per cent. on the cost was the lowest figure at which a licence had been granted. On a cost of 40s. for thermit and labour foreshadowed by Mr. Turner, 2s. 6d. would be a fair royalty. But he maintained that a licence ought not to be granted unless of a case being made out for the need to use any of the patents. There was no evidence from which the inference could be drawn that there was any substantial chance of the applicants doing this welding. Then the applicants could not tell which of the patents they thought they would need to use. The patents were for special things, not for improvements on old processes. He maintained that the tribunal could not be satisfied on the points under the rules. The applicants roped in all the patents relevant to welding, and asked for a licence under any one of them. Surely that was not the intention of this legislation. Let the applicants embark in welding and see what they could do, and if they found that there was a patent here and a patent there for which they wanted to apply, then would be the proper moment for them to come forward. At present he would have thought the proper applicant for a licence would be a Corporation.

THE CONTROLLER GENERAL.—I wish they would come.

Mr. COLEFAX contended that it was not the intention of this legislation that a promiscuous and general licence should be given. Thermit, Limited, did not themselves use all the patents for tramway rail-welding. The applicants had done nothing to start the rail-welding business. All they had done in the course of a whole year was to bring some thermit a little nearer to some iron rails and to say they were about to begin on experiments. They could not show any ground for saying that any one of the patents was required. He asked the tribunal to refuse a licence, but if a licence was granted there should be a proper royalty.

THE CONSTRUCTION OF THE RULES.

Mr. J. HUNTER GRAY followed, also on behalf of Thermit, Limited. He said he wished to deal with the construction of the rules. An applicant for a licence must be both meritorious and competent. If a patentee was carrying out the business of his patent thoroughly and efficiently, and to the satisfaction of the public in this country, to give a licence to someone who would do the work badly would not only not encourage British industry in this country but would discourage it, because if an incompetent competition was allowed it would discredit the value of the processes in the mind of the public, and after the war the public would go back to the Germans again. No single fact had been presented which would justify the giving of any of the patent rights to the applicants. If the present was the sort of applicant to whom a licence should be granted, then heaven help the British industry. Such grants would discredit the abilities of the true British workman. No witness had been called from any Corporation to bear out that statement that any of these bodies would not buy the applicants' thermit because of the patents. Whatever work the applicants did would be done without proper investigation and would be ineffective work, with the result that the process would be discredited very largely in this country. The opponent company was managed by a gentleman who was a British subject, who had been for many years in this country and who carried on the business in the most effective and proper way in the interests of this country. In construing the rules, could it be thought, if the opponents were for any reason stopped from working in this country, that persons like Mr. Turner would fill the gap? There were alternative processes of electric welding which would be adopted instead, and the result would be the destruction of the thermit process in this country. Mr. Gray proceeded to point out that the reason why the Corporations did not apply for licences to work the patents obviously was that they were satisfied with the position. Mr. McElroy, the general manager of the Corporation tramways at Manchester, in the proceedings of the Municipal Tramway Association, 1910-11, had said, "I want to give a word of warning, because so much depends on how the thermit welding is done. In the earlier days when we allowed the ordinary platelayers to do the work the thing was doomed to failure. They did not recognise that it was a scientific job. Now we employ welders supplied by the Thermit Company themselves, and these men get bonuses for correct work. Our three years' experience of thermit welding has led me up to the present time not to consider any other form of joint."

The CONTROLLER GENERAL said a question was whether the manufacturers of this country should not be trained to do the work instead of going on idly and supinely, and whether without a licence they could be given the opportunity.

Mr. GRAY hoped that the Controller would not allow that important consideration, which was far broader than anything dealt with by the Act, to shut his eyes to the fact that by granting a licence he would be defeating his object. By the applicants' inactivity during the past year he should be treated as a naughty child, and told to go away and come back again when he was good, and should then put the tribunal in possession of facts and not prophecies of a most ridiculous kind.

REPLY FOR THE APPLICANTS.

Mr. ROYSTON, replying to the opponents' arguments, said that as regarded the applicants' competence, when they were making alloys by the alumino-thermic process, their works were inspected by Government inspectors, and they were selected as one of the only seven firms selected in this country for the making of such alloys. Was it likely that the Government would choose the applicants if they were incompetent users of the thermit process? The thermit supplied to Corporations was satisfactory. As to the Leeds case, it was quite possible that anybody in turning out the stuff might make bad samples. It was an isolated case, and Leeds had made no complaint to the applicants. They were people of exceptional ability in the work, and to suggest that they could not carry out another thermit process in connection with rail welding was preposterous.

Mr. ROYSTON, in reply to the Controller General, said that the applicants would do the welding themselves for Corporations. If the Corporations bought the applicants' thermit and did the welding themselves, they would not be protected by the applicants' licence.

Some discussion took place on this point, which was closed by Sir C. Dalton saying that if the Corporations wanted a licence they could come and ask for it.

Mr. ROYSTON, on the question of royalty if a licence was granted to the applicants, contended for 5 per cent. on the cost of applying any of the patents, excluding the cost of the thermit, which anybody was at liberty to make.

Mr. TURNER said he would be agreeable to 1s. per joint.

The CONTROLLER GENERAL closed the proceedings by saying that they might require further evidence. If not, the tribunal could consider the matter and report to the Board of Trade.

AMBULANCES STILL NEEDED.

The life of a motor ambulance on the western front is not more than six weeks or two months. This statement was made by a representative of the British Red Cross Society and the St. John Ambulance Association, speaking at a meeting held at Leeds in support of the cinematograph trade's resolve to provide an ambulance convoy at a cost of £30,000. The information will be of interest in view of the article published in our issue of October 16, urging the provision of ambulances by tramway interests. Up to the beginning of October ambulances and other motor vehicles for use in Great Britain, France, Belgium, Malta, Egypt, the Dardanelles, Serbia, and Italy had been provided to the number of 907 ambulances, 33 cycles, 213 cars, brakes, and omnibuses, 55 lorries, 10 repair shops, and 17 soup kitchens. From September 15, 1914, to September 15, 1915, over £280,000 has been spent on the purchase of cars, and about £170,000 on their upkeep. Since then 250 new cars, costing approximately £110,000, have been placed in commission. A single ambulance now costs £450. In the early months of this branch of Red Cross work Mr. A. F. P. Roger was in charge of the department, and on being called to other duties at the Ministry of Munitions last spring, he was succeeded by Mr. E. M. Clarke. The department provides every requisite and comfort for the wounded upon their journey home from the front. A few days ago the British Red Cross Society appealed not only for ambulances but for money to meet the running expenses, which work out at about £8 a week per ambulance.

The Belgian Field Ambulance Service is appealing for £10,000 wherewith to complete their fleet of ambulances.

Five convoys, comprising 120 cars, have been sent to France to supplement the French Red Cross service by the British Ambulance Committee of the Service de Sante Militaire.

LONDON TRAMWAY SERVICE.

POWER PLANT AND CABLE EXTENSIONS.—DOUBLING SINGLE LINES.

A collection of articles that fall through the aperture of the conduit and divert the power was exhibited to the members of the London County Council on December 21. The exhibits, which were retrieved in one week, included six iron hoops. Each article bore a label mentioning the length of time it had delayed the cars. A reserve supply of power is being sought for the Woolwich services, and £4,200 of a sum of £11,800 voted for the provision and laying of cables is to be used for putting down cables in the district. The County Council have sanctioned an outlay of £5,000 for the construction of foundations and floors for a third turbo-generator, to take the place of a reciprocating engine in Greenwich power-station. During the period of the war ordinary fares are to be charged on cars specially run as all-night cars. Experiments are to be made at certain termini and traffic points for notifying the suspension of existing, or the institution of new, car services. Mr. G. H. Hume, chairman of the Highways Committee, informed the Council on December 21 that in the event of any serious stoppage of the tramway services or underground services telephonic notification is given to the South London Electric Railway, so that everything possible can be done to provide extra facilities on the other undertaking. Four single sections of line between Nile Street, Woolwich, and Abbey Wood are to be doubled. The estimated cost of the work is £4,500. The Minister of Munitions suggested that the whole of the tramway should be doubled, but the committee reported that it was impossible at present to double the line throughout.

Digitized by Google

TRAFFIC DANGERS IN LONDON.

Sir Edward Henry, Commissioner of Police, on December 14 issued a statement emphasising the urgent necessity for greater care in the driving of motor vehicles, especially after sunset, in London. Rates of speed that were free from objection in normal circumstances become a source of danger to the public in the dark streets and cannot be permitted. Appeal is made for greater care and for pronounced reduction of speed, both of which are essential to the public safety. The police have instructions to enforce the Motor Car Act with the utmost stringency.

At a meeting of London County Council on December 21, Mr. J. D. Gilbert called attention to the fact that as compared with 1913 in September, October and November this year street accidents had almost trebled, viz., 43 against 15, and asked the Public Control Committee to make representations to the police as to the urgent need for controlling the speed of motor traffic after dark.

Mr. C. U. Fisher (chairman) replied that the police were wholly acquainted with the facts, and no useful object would be attained by making representations. A police notice on the subject was issued during the previous week.

Street Lighting and Accidents.

Mr. Alden, in the House of Commons on December 21 asked the Home Secretary whether he could state the number of accidents, fatal and otherwise, which had taken place in London during the last three months; what proportion of these accidents had been due to the darkening of the streets at night; and whether he would consider the possibility of increasing the illumination in the streets on nights when there was no fear of Zeppelin visits.

Sir John Simon: I am informed by the Commissioner of Police that the number of persons killed in street accidents in the whole of the Metropolitan and City of London Police Districts during the last three months was 263. The number injured, including cases of slight injury, was approximately 7,000. It is impossible to say what proportion of these accidents may have been due in greater or less measure to the darkening of the streets. The number of accidents occurring during daylight is, however, considerably greater than the number occurring after dark. It would not be practicable to vary the lighting of London from night to night.

LEEDS TRAMWAYS OFFICES.

By the opening on December 28 of a portion of the new premises erected for the Tramways and Highways Departments of Leeds Corporation, the tramways undertaking of the city is now able to carry on its work free from the restriction of inadequate space imposed by the old premises in City Square. The new buildings are situated at the junction of Sovereign Street and Lower Briggate and adjoin the central depot. There are four storeys, each connected by separate lifts for passengers and goods. A considerable portion of the basement and the ground floor has been allotted to the traffic department, and a rear entrance has been provided to the office at which tickets are issued to the conductors and their cash is received. On the first floor are the offices of the general manager, Mr. J. B. Hamilton, and the committee-rooms for the Tramways and Highways Departments. The accountant's offices and the drawing office are on the second floor, while the top floor is devoted to rooms containing the ticket receptacles. When completed, about the end of February next, the new premises will have cost about £30,000.

CHANGES AT EDINBURGH.

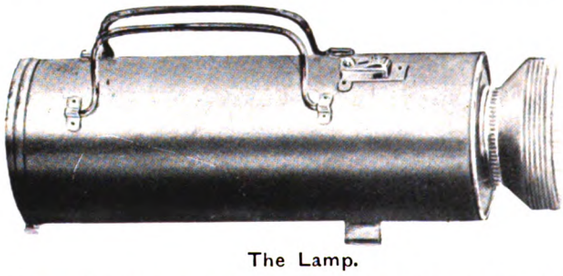
Mr. C. W. Shepherd has resigned the position of general manager and secretary of the Edinburgh and District Tramways Company. The directors have accepted the resignation with regret, and have requested him to retain the position of secretary. In 1913 Mr. Shepherd underwent a severe operation, and has since been in indifferent health. The strain thrown upon him during the war has been so great that he has been reluctantly compelled to resign the position, which he has held for the past nine years. He went to Edinburgh from Bradford thirteen years ago as traffic superintendent, a position he filled for four years.

Mr. J. D. R. Cox, of Messrs. Babcock and Wilcox, Limited, has been appointed general manager and engineer of the Edinburgh and District Tramways Company, in succession to Mr. C. W. Shepherd, and Mr. E. F. Harris, the latter having taken an appointment in London. The salary of the dual position will be £1,200 per annum. Mr. Cox, who is thirty-five years of age, has a reputation for engineering skill and general energy. After serving an apprenticeship to engineering, he was engaged in Glasgow Corporation electricity works, and prior to the war he was assistant commercial manager in Scotland for Messrs. Babcock and Wilcox. Soon after the outbreak of the war he joined the Scots Greys, and later received a commission in the R.F.A. Recently he returned home to act for the London manager of Messrs. Babcock and Wilcox during illness.

A LAMP FOR CONDUCTORS.

The illustration in this column depicts a conductor equipped with a new single cell portable hand lamp to enable him efficiently to discharge the duty of giving change and punching tickets during the period of restricted lighting.

It is known as the "Razzo," and has been introduced by the Equipment and Engineering Company, 2, Norfolk Street, Strand, W.C. For illuminating purposes a 1½-volt bulb is provided in a reflector, and as standard types of dry cell are used, refills can be easily obtained. A single charge gives about fifty hours' light.



The Lamp.

The weight is 39 oz., and the lamp is 2⅞ in. diameter by 9 in. long. It is made in three finishes, namely, pressed steel (black) seamless brass (burnished finish), and seamless brass nickel-plated.

PASSING OF STATIONARY TRAMCARS.

A Manchester Request for Legislation.

Manchester Watch Committee have asked the Traffic Congestion Committee of the Corporation to seek Parliamentary powers for dealing with the danger caused to tramcar passengers by vehicles driving through them while they are entering or leaving a car. Attention was drawn to the matter by a member of the Watch Committee at a meeting of that body held on December 9, with the result that the Committee requested the Chief Constable to issue a notice calling attention to the danger attending the practice. Motor drivers are the principal offenders, and the Chief Constable was instructed to prosecute in the case of offences committed after the warning has been given. Ample authority for this course exists in Section I. of the Motor Car Act, which relates to driving to the danger of the public.

London and South Western Railway Electrification.—In the description of this undertaking given in our issue of November 18, we inadvertently omitted to mention that W. T. Henley's Telegraph Works Company, Limited, supplied, through Messrs. Tyler and Freeman, 40, Chancery Lane, London, W.C., a large quantity of single 3-core rubber insulated wire armoured cable of various sizes, including 19/14, 19/15, 19/18, 37/13, 37/15, and 61/13.

Digitized by Google

THE WAR AND TRAMWAY TRAFFIC.

EFFECT OF ENLISTMENTS AND REDUCED LIGHTING.

Combined with the restricted lighting, the increased number of enlistments is making the maintenance of tramway services a matter of considerable difficulty. The outlook is rendered more serious in a number of places on account of the opening of new national munitions factories. A vast number of men and women are being drafted to those districts to work in the factories, with the result that there will be a demand for additions to the workpeople's tramway services. Car facilities for workmen are already abnormal in many towns, owing to munition work being performed in shifts. As more and more unskilled hands are trained, night work in the factories will increase.

Several tramway undertakings have been inconvenienced through inability to prevent workmen engaged in car repairing shops leaving to secure employment elsewhere. Wolverhampton Munitions Tribunal recently considered a complaint by a blacksmith and a blacksmith's striker who were employed solely in repairing cars at the tramway depot. They had secured work on Government contracts, but the manager refused to grant the leaving certificates. In a letter to the Court the employers remarked upon the importance of maintaining an efficient service for the use of munition workers, and the necessity of keeping the remainder of their depleted staff. The Court decided that as the applicants were not engaged on munition work, and that as they did not come within the meaning of the section, no discharge certificate was necessary. The applicants were free to go where they liked.

The position of Birmingham Corporation Tramways may be regarded as typical of traction undertakings in all the centres where war work is in progress. Although there are now nearly 600 women conductors, the department is 20 per cent. below strength. Barely 25 per cent. of the uniformed staff of 1,600 who were employed prior to the war are at work on the cars now. Consequently the service on some of the routes has suffered, and no improvement can be made until the voluntary motormen have been trained. Every spare car that can be manned has to be placed on routes serving munition areas, and more are needed.

A scheme was sanctioned by Newcastle Tramways Committee on December 16 in order to enable the services to be maintained until 10 p.m. on weekday evenings, instead of withdrawing the cars at nine o'clock, as had been done since November 1. Mr. Ernest Hatton, the general manager, had submitted to the employees' representatives a schedule that altered the working hours by the inclusion of more women conductors and volunteers in the running of the cars in the early morning, thus enabling more men to be employed at night. In return for the extra hours worked, the employees are promised a short day once every third week, and a day off every week. Additional men and women are being trained, and Councillor R. Mayne, chairman of the Tramways Committee, has stated that the difficulty was to get volunteers who could train during the day. He has appealed to such men as ministers and insurance agents to come forward and add to the 120 volunteer motormen now working on the cars. While the committee were conscious of the inconvenience caused to some of the community by the curtailed service, the tramways, he has stated, were carrying 50,000 more workmen per week, and in this connection he paid a high tribute to the general manager. It is worthy of note that the Amalgamated Society of Engineers have written to the Corporation expressing approval of the Tramways Committee's action in concentrating upon the workmen's traffic.

Mr. C. J. Spencer, general manager, Bradford Corporation Tramways, has advertised for conductors ineligible for military service, and also for auxiliary car drivers, in order to enable the department to provide against the anticipated difficulty in meeting public demands. The advertisement for auxiliary drivers invited applications from "public-spirited men who are ineligible for military service, and who are willing to undertake to learn drivers' duties, with a view to their employment at week-ends, and during other periods of heavy traffic. Up to December 17 there were 150 applications, and those who passed the medical examination are being trained.

Bournemouth Corporation decided that the last cars should start at 10.30 p.m. between December 13 and January 10, and at 10 p.m. after the latter date. Councillor Bell, chairman of the committee, said they were agreed that it was not advisable to ask men who were tired to take the cars through a black atmosphere for a longer period. The manager had compiled a list of 30 towns where the hours had been curtailed to a much greater extent, and in 12 other towns the committees were bringing up recommendations.

British Electrical Manufacturers and Russia.—The Electrical Manufacturers' Company of Great Britain, Limited, has been registered, with a nominal capital of £12,000, in £1 shares, to carry on business in Russia and elsewhere. The promoters are Messrs. Bruce Peebles and Company, Crompton and Company, the Lancashire Dynamo and Motor Company, Allen West and Company, Brook, Hirst and Company, Eckstein, Heap and Company, and Whipp and Bourne. The first directors are Messrs. J. H. Bunting, E. R. Reeves, H. C. Siddeley, W. J. Moggridge, J. A. Hirst, A. Eckstein, and S. Whipp.

OFFICIALS AND MEN ATTESTED.

Throughout the country, tramway, railway and omnibus employees of military age, i.e., between 19 and 40 years, have submitted themselves to medical examination with a view to being enrolled in Section B of the Army Reserve, under Lord Derby's scheme for the preservation of voluntary enlistment. It is left for their employers to claim before the local tribunals retention in civil employment of such men as they deem to be indispensable. A considerable number of men enlisted for immediate training in the early part of the special recruiting period that ended on December 11, but in the case of the employees of one London company there was a rush of men to join the reserve, or to secure the medical examiner's certificate of rejection during the last day of the period. In a number of places the eligible chief officials of transportation and electricity undertakings were attested, with the result that their release will have to be claimed.

A report recently issued by Manchester Tramways Committee stated that the number of men in the service of the department who had joined the colours before the end of November was 2,107, and the payments now being made in respect of those men are at the rate of £72,000 per annum. If all the available men of military age then with the department were to join the colours, the cost of making payments to those men or their dependants, in accordance with the Council's resolutions, would be about £110,000 per annum. This, the report stated, would be a serious drain upon the financial resources of the department. The general manager suggested and the committee approved the suggestion, that the men in the department's service who wished to join the forces should enlist under the group system (Section B, Army Reserve).

Arrangements were made for Bradford tramway employees who desired to enlist to be attested under Lord Derby's scheme for postponed service, but the tramways manager stipulated that they should first apply for permission, and each take to the recruiting officer a letter intimating that before any of the men were called up the department should have the opportunity of appearing before the local tribunal in the event of a man's services being considered indispensable to the working of the tramways.

Newcastle Corporation decided that employees who entered into military obligations up to December 11 should receive allowances for dependants when the men are called up. The Council are paying £37,215 per annum to dependants, and £13,919 in war bonuses to workmen.

A QUESTION IN PARLIAMENT.

In the House of Commons on Dec. 21, Mr. Hohler asked the Under Secretary for War what steps should be taken to secure that light railway and tramway companies were left with sufficient staffs to maintain the necessary minimum service and fulfil their obligations, especially in naval, military and munition centres; and would he direct that the appellate tribunals and the recruiting officer should consider the needs of the service as a whole and deal with the entire body of men attested.

Mr. Tennant replied: Skilled men in public utility services, such as tramways, waterworks, etc., are not accepted for immediate enlistment. If such men have been attested for Army Reserve Section B, under Lord Derby's scheme, a mark is made against their names in the army register, and they are not called up for military service unless their employers state that their services can be spared.

ADELAIDE AND LAUNCESTON TRAMWAYS LABOUR DISPUTE.

In the Arbitration Court at Melbourne, the Adelaide Municipal Tramways Trust, Launceston Municipal Council, and the tramway employees have registered agreements arrived at in connection with the demand of the men for increased wages and better conditions of labour. The agreements are to extend over three years. The rates to be paid are to continue until the revenues of the respective Corporations are more than sufficient to meet obligations, and a conference is to be held in August each year between representatives of each party to review the financial position and fix such wages as are considered justifiable. A Board is provided to deal with any disputes that may arise. It is also agreed that employees must within one month of joining the service become members of the Tramway Employees' Association.

NO OMNIBUSES IN PARIS.

The budget report of the Paris Municipality for 1916 gives the reason why the city has been without a motor omnibus service since the vehicles formerly in use were impressed by the military authorities in August, 1914. In the first place, no new omnibuses could be built as the factories were engaged on munition work. An equally important consideration was that, owing to the Government requiring so large a supply of motor spirit, no guarantee could be given that an adequate quantity could be obtained for omnibus use.

Digitized by Google

THE EMPLOYMENT OF WOMEN.

EXPERIMENTS WITH WOMEN DRIVERS.

Glasgow Tramways Department are continuing the experiment of car driving by five young women, which has been in progress since November 1. The convener of the Tramways Committee was asked at a meeting of the City Council on December 9 if the experiment of appointing women car drivers had been a success, and if he would inform the Council what were the hours worked by these drivers, and what pay they were receiving. Councillor Montgomery replied that no proposal for the appointment of women car drivers had been before the committee, and it followed that the question of hours and wages for such work had not been considered. Mr. Dalrymple, the general manager, had placed a number of women on the cars as drivers, in order that he might be able, in the event of any emergency arising, to advise the committee as to the suitability or otherwise of women for this class of work.

Glasgow Tramways Committee have since asked the Council to approve of an extended test of women as drivers by provisionally increasing the number from five to thirty. The committee also reported that the number of female conductors now exceeds one thousand.

The uncertainty of retaining the services of the motormen who have passed into the Army Reserve under Lord Derby's scheme has led Mr. J. B. Hamilton, the general manager at Leeds, to make an experiment in the use of women as car drivers. A number of robust young women are being put through a course of instruction, so that a report can be made to the committee as to the prospect of filling vacancies from that source of supply.

A few women are engaged in similar work at Cardiff, Darlington, and Barrow.

Alderman H. Linsley, chairman of Salford Tramways Committee, has stated that the committee were not placing any obstacle in the way of their employees enlisting. There was a scarcity of competent male drivers. Salford was the first borough in Lancashire to introduce women conductors, and it was quite possible that women drivers would have to take the place of those who are volunteering for the front.

Women conductors are now almost universal in Great Britain. On the London County Council's cars they took up their duties on December 4, attired in neat grey uniforms and waterproof hats. At first they are being employed only on the single-deck cars and on the trail cars. The manner in which they are discharging their duties affords evidence of careful training.

Bradford City Council, on December 14, decided that an experiment in the employment of women as conductors should be made, the rates of wages and hours of duty to be the same as for men, except that the women should have longer meal reliefs. No woman now employed in the textile trade will be engaged. The Council accepted a labour amendment to dispense with all women employees at the end of the war.

Aberdeen Council have authorised the temporary appointment of a woman ticket inspector, and also of women as car cleaners. The inspector will be paid 35s. a week, and her duties will be restricted to the women employees.

WOMEN CAR DRIVERS IN BERLIN.

Notwithstanding that a previous trial had proved unsatisfactory, the Greater Berlin Tramways Company are again experimenting with women as car drivers. According to a report received in the autumn from Switzerland the management were endeavouring to secure men from neutral countries. Evidently that alternative has failed, for on December 19 an Amsterdam correspondent announced the receipt of a message from Berlin to the effect that the company find themselves compelled to fall back upon women to act as drivers, owing to several hundreds of motormen having been called up for army service. Many people, the report says, are protesting against the employment of females and threaten to boycott the cars driven by women, as they do not consider them strong enough to manage full-sized cars with safety to passengers and the street traffic.

CONCESSION ON EXCESS PROFITS.

In the House of Commons on December 7, on the resumed consideration of the Finance Bill, the Chancellor of the Exchequer moved an amendment to Schedule 4, providing that local authorities should be allowed to deduct from their excess profits the amount which had to be paid in respect of the sinking funds.

Mr. Rawlinson, Sir F. Banbury, and Mr. Stuart Wortley protested against preferential treatment of trading local authorities.

The amendment was agreed to, and the Bill passed the report stage, and was ordered for third reading.

At a meeting of Sheffield Corporation on December 8, the Chairman of the Finance Committee said the Chancellor also indicated that he would allow Corporations to pool all the trading departments. As an illustration, the Corporation anticipated a deficit of £20,000 on the water department this year, but they would be allowed to deduct that from the tramway profits before beginning to calculate as to excess profits.

WINTER UNIFORMS FOR WOMEN.

The accompanying illustrations show the neat and serviceable uniforms that have been provided for winter wear by the 60 women at work on the Oldham Corporation tramcars. The garments are made to a design registered by Mr. J. W. Dugdale, the general manager, who has been congratulated by the Tramways Committee upon the suitability of the outfit. Already it has been inspected by managers from other tramways.

The first picture shows the dress in which girls travel to and from duty, when they wear a skirt of ordinary length. The second photo-

Off-Duty Uniform of Conductors at Oldham.

graph depicts the uniform that they wear when upon the cars. It is apparently a short skirt. In reality the garment is of the bloomer type, and there are also high cloth gaiters of the same material as the skirt and tunic. There is also a top coat of exactly the same length as the skirt, but of heavier material. The clothing was made by Briggs, Jones, and Gibson, Limited, of Manchester.

At Portsmouth the women have been given waterproof gaiters, a waterproof cover for the cap, a mackintosh, and an overcoat, in addition to their ordinary uniform.

Uniform Worn While at Work.

The outfit cost of the ten women conductors at Colchester is £3 19s. 6d. per head. They are provided with hat, tunic, skirt, south-wester, and oilskin coat.

A thaw following a heavy snowfall in Leeds on December 10 made matters trying for the 160 women conductors who were on duty. Only three, however, reported themselves as sick. The slush carried on to the platforms and the staircases made their skirts wet, and one woman came on duty the following day in a more fitting garb. She was wearing knee boots, and had fastened the skirt up out of reach of the stairs.

Mr. Arthur Ellis, general manager at Cardiff, has now secured bloomer skirts and long gaiters for the girls employed on the tramcars. In addition, their uniform comprises a greatcoat, mackintosh, and two hats. Girls are also employed in the parcels delivery department, and at Christmas a record number of parcels was dealt with.

Digitized by Google

BRITISH COLUMBIA ELECTRIC RAILWAY.

EFFECT OF THE WAR.

The directors' report for the year ended June 30 gave the net revenue as £180,601. It has been decided to draw £60,000 from the reserve and pay 2½ per cent. on the preferred ordinary stock, leaving £6,667 to carry forward. The directors proposed to pay the dividend for the current year on the 5 per cent. preference stock out of the reserve, being of the opinion that the company's financial position justified that course. They were unable to hold out any hope of being able to recommend the payment of any dividend on the preferred ordinary or deferred ordinary stocks for the present year. Owing to the war, and especially to the resultant paralysis of the shipping trade, commercial depression had prevailed throughout British Columbia, which had brought about an almost complete cessation of expenditure by the Government, municipalities, railways and other large undertakings. On June 30 the wages agreement terminated, and the Board of Arbitration made an award, reducing the rate of wages paid to the employees by about 8 per cent., which would represent a saving of about £22,000 per annum. The expenditure on capital account during the year had been $875,558, which compared with $4,110,327 for the previous year.

At the annual meeting of shareholders held on December 30, at Liverpool Street Hotel, London, Mr. Harold G. Brown read the speech prepared by Mr. R. M. Horne-Payne, the chairman of the company, who stated that British Columbia had suffered from the effects of the war very acutely, owing to shipping facilities practically ceasing to exist during the early part of the war, because of the presence of the German Fleet in the Pacific Ocean, and in consequence of the great demand and high prices paid for ships. Rich men had lost their fortunes, artisans and labourers had been thrown out of employment; industries had been closed down, and property which was worth many thousands of dollars had been sold to realise the taxes due upon it. There had resulted a commercial paralysis which had produced so great a falling-off in the receipts of the company that it was probable it would not earn in the current year more than sufficient to pay its debenture interest. Fortunately, the war did not find them in a weak position as regards cash resources, and by immediately cutting down capital expenditure and enforcing rigid economy, the position had been strengthened, and the company was in a position to withstand even the present acutely bad times. Unfortunately, as events had turned out, they had extended their tramway system and increased the equipment and power plants largely beyond the requirements of the business at present available, and had, for the time being, large amounts of capital unremuneratively employed. For instance, the power plants on the mainland and Vancouver Island had cost $13,475,000, and were capable of producing about twice as much power as was required at present.

JITNEY MOTOR COMPETITION.

The depression had been accentuated by the jitney motor competition, which had, however, fallen off during the winter. The general manager held the opinion that they would not be troubled so much next summer with the jitney motor. The company had struggled to maintain an efficient service throughout all their districts. At present the jitneys took the cream of the traffic in the more thickly populated centres. It was impossible for the jitneys to supply the needs of the outlying districts at anything like the fares the company charged, but if the people insisted upon supporting this unfair competition in the thickly populated areas, the company would have no alternative but to leave some of the outlying districts without travelling facilities. Every effort had been made to strengthen the company's friendly relations with the municipalities, and although the Board had been compelled to refuse many requests involving expenditure of money, it was hoped that the municipal authorities were beginning to appreciate the company's difficulties, and to see that the interests of the company and the community were identical. As the result of the wonderful crop, and the stimulus given to every branch of manufacture by the increased spending power derived from it, and also from the large munition orders, a great revival of trade had taken place in the Eastern and Central provinces. The Panama Canal and the Canadian Northern Railway across the Continent to Atlantic would prove most powerful factors in hastening the development of British Columbia on the return of normal conditions. In conclusion, the chairman referred to the enthusiasm of British Columbia in sending men to fight for the Empire.

EFFORTS TO OBTAIN FAIR REGULATIONS.

In reply to questions, the chairman said he thought that the ordinary motor car could not subsist for any length of time on the fares they were getting. On the other hand, it was possible that some form of vehicle would develop that would be a serious competitor with the tramways. The competition up to the present had been largely from owners of motor cars, and they would have to wait to see what was the final result. If a motor car operating in the heart of the city and taking the cream of the traffic was unregulated it could be made to pay. The directors had been striving to get fair regulations, and he hoped they would succeed. With regard to the provision for renewals maintenance, he would ask the stockholders to allow the directors to keep up this provision. One permanent and satisfactory feature was that in this time of stress they had plenty of money in hand.

The report was adopted, and Messrs. E. L. Evan-Thomas and T. Blundell Brown were re-elected directors. A reference to the general manager and staff will be found in our "Personal" columns.

FINANCIAL REPORTS AND MEETINGS.

Manila Electric Railroad and Lighting Company.—A quarterly dividend of 1½ per cent. has been paid.

Shell Transport and Trading Company have declared an interim dividend of 10 per cent., free of income tax.

Brazilian Traction, Light, and Power Company.—Quarterly dividend of 1½ per cent. on the preference shares is announced.

Canadian General Electric Company.—For the quarter ending December 31, the board have declared a dividend at the rate of 7 per cent. per annum.

Yorkshire (West Riding) Electric Tramways Company.—An interim dividend at the rate of 6 per cent. per annum on the preference shares is announced.

Melbourne Tramway and Omnibus Company.—The directors have declared a dividend of 6d. per share for the quarter ended December 31, and also a bonus of 1s. per share.

Blackpool, St. Annes, and Lytham Tramways.—The accounts for the year ended October 31, after providing £7,500 for interest on debenture stock and £1,500 for sinking fund, show a debit balance to be carried forward.

Manx Electric Railway Company.—The accounts for the year ended September 30 show a loss of £9,436. The debenture interest (£9,000 per annum) was paid in cash for the first half-year, and funded by the issue of second debentures for the second half.

Belsize Motor Company's Dividend.—As the result of the past year's trading, the directors recommend a final dividend of 6 per cent. on the ordinary shares, making 10 per cent. for the twelve months, adding £25,000 to the reserve, making that fund £75,000, and carrying forward £10,312 subject to fees.

India-rubber, Gutta Percha, and Telegraph Company.—The net profits for the year ended September 30 were £80,404. A final dividend of 15s. per share is proposed on the ordinary shares, making 10 per cent. free of income tax for the twelve months, and carrying forward £18,938 subject to excess profits duty.

Halifax Tramways and Electricity Profits.—In his annual report on the Corporation's accounts for the year ended March 31, the borough treasurer states that the electricity works profit was £13,036, equal to 4·29 per cent. on the capital expenditure. On the tramways the net surplus was £16,211, or 3·87 per cent. on total expenditure.

Burmah Electric Tramways and Lighting Company.—The directors have declared a dividend of 5 per cent. (5s. per share) on 6 per cent. preference shares for the period from February 1, 1906, to November 30, 1906, leaving 52 per cent. in arrear, adding £2,000 for the depreciation account, making £18,394, and carrying £842 forward.

Bombay Tramways and British Income Tax.—At a meeting on December 18, in India, of shareholders on the Indian register of Bombay Electric Supply and Tramways Company, the chairman (Sir Sassoon David) said legal opinion in England and India agreed that the only means by which the company could escape from liability to pay income tax in England was by transferring the management to Bombay. Resolutions, providing for alterations in the constitution of the company, were adopted.

The Half-year at Bournemouth.—In his report on the tramways undertaking during the half-year ended September 30 last, Mr. I. Bulfin, general manager, states that the receipts show an increase of some £2,618 on the corresponding period of last year. The working expenses, £30,973, include the extra cost of materials, the amounts paid to dependants of men who have joined the army, and the war bonus to the staff. The working costs show a decrease of some £600 to £700 on last year's figures. The gross balance is £28,940, as against £25,647, an increase of £3,293. The percentage of working expenses to receipts works out at 51·76, the lowest figure yet obtained. Receipts per car mile, 16·55d., 2d. more than in any similar period.

Selsey Tramways Company.—At the annual meeting held at Chichester, it was reported that the gross receipts were £3,553. After meeting interest on debentures and mortgage loans, there was a balance of £21 to be carried forward. Mr. Heron-Allen (chairman) said what was required was to make the line commensurate with the needs of Chichester and Selsey. Selsey seemed to grow in attraction every year, and commercially it was extremely prosperous owing to the influx of visitors. The shareholders should take their courage in both hands and do something to make the line worthy of the services it was expected to perform. Thanks were expressed to the managing director, Mr. Street, and to the secretary and manager, Mr. H. G. Philips.

Digitized by Google

Provincial Tramways Company.—Presiding at the annual meeting, Mr. A. Beattie said that the profits were better than usual, a fact which was due to their undertakings in the south of England. In the north, however, the war had affected them adversely, especially at Grimsby. Many of the employees had joined the army, and in allowing all eligible men to go the directors thought they were doing as much as by paying any excess profits to the Government. It was certain, however, that a great amount of money would be wanted to pay for the war, and they would no doubt be heavily taxed on their profits. Mr. S. Hern was re-elected a director, and, acting on a suggestion made by a shareholder, Mr. Supple, of Dublin, the meeting voted a bonus of £600 to the directors for their services.

Coventry Chain Company.—The net profits of the Coventry Chain Company for the year ended August 31 were £21,972, and £3,461 was brought forward. A dividend of 8 per cent., and a bonus of 2 per cent., was proposed on the ordinary shares, adding £5,961 to the reserve fund, and carrying forward £9,348. At the annual meeting at Coventry, on December 17, Mr. Norman Hill, who presided, proposed a dividend of 10 per cent. on the ordinary shares for the past year. He said the immediate effect of the new capital issue was the disappearance of the overdraft and mortgages to the bank, and a considerable increase in investments. Both works are almost exclusively engaged on war work. Another successful year was anticipated. Messrs. T. J. Keegan and R. S. Cattanach were re-elected directors.

Costa Rica Electric Light and Traction Company.—The net earnings in Costa Rica for the year ended June 30, 1915, amounted to £21,662, a decrease of £4,689, mainly due to the adverse exchange. During the year the gold premium has averaged 150 per cent., as against 112 per cent. for the previous year. There is a net surplus of £3,833, which sum the directors propose to carry to the credit of discount and commission on debenture issue account. The power plant at El Brasil has worked well throughout the year. Some trouble that was experienced in times of flood has been eliminated by the installation of larger sluice gates. The business of the company has suffered from the interruption of exports and general dislocation of trade, but in view of the serious loss entailed by the high rate of exchange, the directors consider the result very satisfactory.

Cordoba Light, Power, and Traction Company.—For the year ended September 30 the net profits were £19,034, and £26,320 was brought forward. In future, dividends will be paid on the preference shares for the periods ended September 30, and a final distribution on those shares for eight months at the rate of 6 per cent. per annum is proposed, carrying forward £26,580. Mr. G. A. Touche, M.P., presiding at the annual meeting on December 16, said the gross receipts of the combined businesses amounted to £157,590, compared with £160,420 in 1914 and £154,060 in 1913. The operating expenses were £1,360 higher, in part due to the coming into force of an increased percentage payable to the Government. The net receipts were £83,320, compared with £87,510 in 1914 and £80,830 in 1913. The percentage of expenses to the gross receipts of the two undertakings was as follows:—1913, 47·5 per cent.; 1914, 45·4; and 1915, 47·1. The results were better than might have been expected, and reflected credit on Mr. C. C. Lewis, the excellent manager at Cordoba, and on the staff.

Blackpool, St. Annes, and Lytham Tramways, Limited.—Mr. G. Nicholson presided at the annual meeting at Liverpool, on December 17. The report referred to the gratifying increase in the receipts and the improved profit upon the year's working, and stated that the trustees for the debenture holders had intimated their intention of distributing 4 per cent. interest on account of arrears of interest. Traffic receipts were £34,872, and the net receipts £29,159, the balance to the profit and loss account being £7,594. The chairman remarked that the balance sheet was the most satisfactory since the inception of the company. The receipts showed an increase of £4,300, due to the fine weather in September and October. Sixty-three of their staff had joined H.M. Forces, and he regretted that three had been killed in action and six wounded. The manager had employed girl conductors to the number of 30, and they had given every satisfaction. Their wages came to rather more than the men because they only worked 8½ hours daily, against 10 by the men. The company had paid £307 to the dependants of employees. The report was adopted, and Mr. T. Preston was re-elected a director.

Isle of Thanet Electric Tramways and Lighting Company.—In their report for the year ended September 30, the directors record a profit balance of £10,050, compared with £18,063 for 1913–14, and £21,635 for 1912–13. Of the first-mentioned sum, £303 was derived from profit on the motor omnibus services. These vehicles stand at a value of £1,567 in the balance sheet. The total traffic receipts of the two departments were £22,752, while from the sale of electricity £8,011 was derived, and £151 from carriage of parcels. The report proceeded:—"Owing to the absence of visitors, on whom the prosperity of the district depends, and to the restrictions on lighting, both the tramway traffic and the sale of electricity have suffered severely from the war. The receipts, which were £48,507 in 1912–13, the last complete financial year before the outbreak of hostilities, fell last year to £31,589, a difference of £16,918, while the saving in expenses was only £5,333, owing to standing charges that could be only gradually reduced and to the increased price of coal. The directors expect to reduce the expenses further during the current year. Notwithstanding the unfortunate conditions prevailing, the profits proved sufficient to pay all the interest charges, and to allow of £974 being carried forward. In view of the continued depression which existed during the whole year, the directors regret that they did not find themselves justified in making the payment of 2½ per cent. on the preference shares foreshadowed in their last report. The prospects of the undertaking were most promising when they were so suddenly affected by the outbreak of the war. The company had just completed large extensions of their generating plant, and were in an excellent position to meet the growing demands for light and power, and the increasing traffic on the tramways." The board waived £575 of the sum of £900 due to them as fees.

Oldham Corporation Tramways.—A deficiency of £5,217 resulted from the working of this undertaking during the year 1914-15, a period including eight months of the war. Forty per cent. of the employees had joined the forces at the end of the financial year, and the sum of £2,121 paid to their dependants has been charged to the revenue account. In consequence of the depletion of the staff the holidays of the traffic employees had to be cancelled, but double pay was given for the time that would have been allowed as leave. On Christmas Day an addition of one shilling was made to each man's pay. The following table gives the principal statistical items for the past two years:—

	1914-15.	1913-14.	Inc. or Dec.
Capital expenditure	£453,655	£444,563	+£9,092
Loans outstanding	£317,878	£318,196	− £318
Track mileage (single)	37	36	+ 1
Number of cars in stock	97	92	+ 5
Traffic revenue	£111,679	£114,480	−£2,801
Total revenue	£113,814	£116,169	−£2,355
Working expenses	£85,083	£78,303	+£6,780
Gross balance	£28,730	£37,866	−£9,136
	Deficiency.	Surplus.	
Net balance	£5,217	£5,026	-
Passengers carried	22,171,712	22,773,108	- 601,396
Average fare per passenger	1·19d.	1·19d.	—
Car mileage	2,045,840	2,077,104	−31,264
Units per car-mile	1·544	1·585	— ·41
Power cost per car-mile	2·316d.	2·376d.	− ·060d.
Traffic receipts per track mile ...	£3,018	£3,136	− £118
Traffic receipts per car-mile	13·351d.	13·422d.	− 071d.
Expenses per car-mile	9·981d.	9·047d.	+ ·834d.
Ratio of working expenses	74·75	67·40	+ 7·35

Cardiff Corporation Tramways.—When the city treasurer presented his annual report on the financial results of the tramways and electric lighting for the year ended March 31 last, Sir J. W. Courtis, chairman of the committee, remarked that notwithstanding the adverse conditions owing to the war, the year's working had resulted far more favourably than had been anticipated. The report has now been published in volume form, together with the report of Mr. Arthur Ellis, the tramways manager and borough electrical engineer. At the beginning of July, 1914, the traffic receipts showed an increase of £3,000, but there was a steady decrease week by week, until at the end of the financial year the war brought about a total decrease of £2,846. After providing for depreciation fund the available surplus was £10,002, and of this sum the Committee decided to transfer £9,120 to the reserve fund and £881 to capital account. The reserve fund would then amount to £9,963. Mr. Ellis states that it is necessary that a substantial reserve should be built up, out of which could be defrayed the cost of installing a more modern power plant. The following statement gives the principal statistical items for the past two years:—

	1914-15	1913-14	Inc. or Dec.
Capital expenditure	£811,043	£786,510	+ £25,533
Loans outstanding	£485,049	£514,059	— £29,010
Total track mileage	31 m. 66 ch.	31 m. 66 ch.	—
Number of cars in stock	130	130	—
Traffic revenue	£138,672	£141,519	— £2,847
Total revenue	£164,683	£166,200	— £2,517
Working expenses	£97,360	£99,064	— £1,704
Gross balance	£68,446	£68 384	+ £62
Net profit	£16,949	£18,594	— £1,645
Passengers carried	30,424,407	31,122,962	— 698,555
Average fare per passenger	1·09d.	1·09d.	—
Car mileage	2,742,546	2,966,230	— 223,684
Units per car mile	1·80	1·71	+ ·9
Power cost per car mile	·835d.	·850d.	— ·15d.
Traffic receipts per track mile ...	£4,358	£4,448	— £90
Traffic receipts per car mile	12·14d.	11·45d.	+ ·69d.
Expenses per car mile	7·028d.	6·781d.	+ ·247d.
Ratio of working expenses	56·9 p.c.	58·2 p.c.	— 1·3 p.c.

Allowances to dependants of employees who had joined the forces cost £5,720 per annum, and the bonus granted to employees £2,000 per annum. Power station expenses showed an increase of only £333, although the output increased over half a million units.

Chas. Macintosh and Company's War Relief Fund.—The employees of Chas. Macintosh and Company, Limited, india-rubber and tire manufacturers, of Manchester, during the first year of the war have contributed £2,239 to various relief funds. To that total the company added an equal sum, bringing the aggregate to £4,478.

Digitized by Google

CONTRACTS AND ORDERS.

Wolverhampton Tramways Committee have accepted the tender of Hadfields, Limited, for the supply of 14 pairs of points.

Dunlop Tyre Company have received a contract at 1d. per car mile, for supplying rubber tires to the railless trolley vehicles of Aberdare Council.

Glasgow Tramways Committee have accepted the tender of the British Insulated and Helsby Cables, Limited, for the supply of copper trolley wire.

Noyes Brothers' tender for the supply of overhead equipment has been accepted by Prahran and Malvern Tramways Trust (Victoria), at £4,116.

The Anger Manufacturing and Supply Company, Limited, have received the order to supply all cars of the Preston Corporation Tramways with two jacks.

Newport Council have purchased Bedwas navigation coal at 14s. 6d. per ton, and Crumlin Valley coal at 12s. per ton, both in 300 ton lots, for their electricity works.

Portsmouth Council have placed tenders for the supply of uniforms for motormen and conductors at prices 10 per cent. above those paid under the contract made in November, 1913.

Tudor Accumulator Company have offered to maintain for five years the battery of a new 30-cwt. electric vehicle acquired by the Metropolitan Asylums Board for use at Queen Mary's Hospital.

Southampton Tramways Committee have allotted contracts as subjoined:—Lancashire Dynamo Company, motor generator £181, switchboard £100; Thermit, Ltd., welding 140 rail joints at 25s. per joint.

Public Services Tender Board, Wellington (N.Z.) have accepted the tender of Turnbull and Jones, Limited, for the supply of 120 miles of copper cable, at £3,460. There were seven tenders, the highest being £4,269.

Luton Electricity Committee have recommended the acceptance of the tender of the Davenport Engineering Company for water cooling plant of 180,000 gallons capacity, at £1,460, and of Messrs. Johnson and Phillips for switchgear, at £860.

The British Thomson Houston Company, Limited, of Rugby, about a year ago supplied to the Nuneaton Corporation a 750-K.W. geared Curtis turbo-generator. This set has worked so satisfactorily since its installation that the Nuneaton Corporation have placed an order for a duplicate set, to be delivered in the near future.

Siemens Brothers' Dynamo Works, Limited, have received an order for the supply of Wotan, Tantalum and carbon lamps to the Aberdeen Line for the year 1916. The company were the successful tenderers for supplying Wotan and carbon filament lamps to the Royal Mail Steam Packet Company for twelve months from January 1, 1916.

Stockport Council have accepted the following tenders:—Tramway stores: Dick, Kerr and Company, Limited, H. Hollingdrake and Son, British Thomson-Houston Company, Limited, Baxendale and Company, Wilkinson, Heywood and Clarke, Liverpool Jute Bag Company, Spicer Brothers, Limited, Rostron Brothers, McClure and Whitfield, Brecknell, Munro and Rogers, and Brush Electrical Engineering Company.

Victorian Railway Commissioners have placed contracts as appended:—Siemens Bros.' Dynamo Works, British Insulated and Helsby Cables, Limited, and Australian General Electric Company, electric lighting material for Jomont car repair shop; Gibson, Battle and Company, drilling machine; Noyes Brothers, electric light wire and lathe for turning and grinding commutators of traction armatures; Lascelles Parrington, motor generator, switchboard and accessories for battery charging; Babcock and Wilcox, Limited, 5-ton electric crane.

PERSONAL.

Mr. R. H. Scotson has been appointed electrical engineer to Middlesbrough Council.

Mr. C. E. Garnett, electrical engineer to Darwen Corporation, has enlisted under the group system.

Mr. W. G. Snell, tramways manager to Perth Corporation, has attested for the Army Reserve.

Mr. R. H. Scotson, deputy manager at Middlesbrough, has been appointed borough electrical engineer.

Mr. E. Combdy, of Rugby, has been appointed mechanical engineer at Huddersfield Corporation electricity works.

Councillor D. T. J. Lyle has been re-elected chairman of Maidstone Corporation Light Railways Committee.

Mr. F. J. S. Hosken, general manager and engineer, Darwen Corporation Tramways, has enlisted under the group system.

Mr. J. W. Bachelor, of Hendon, has been appointed station superintendent at Walthamstow Council's electricity works.

Mr. R. E. Armstrong, charge shift engineer at the Greenwich generating station of the London County Council, has resigned.

Mr. H. Broadbent, formerly chief electrical engineer to Perth Corporation, is now engaged at Kynoch's munition works, Birmingham.

Mr. E. Lunn has been appointed station superintendent at Huddersfield electricity works, the vacancy having been created by the death of Mr. Whitwam.

Mr. J. E. Starkie, Burnley borough electrical engineer, is one of 25 out of 26 eligible members of the staff of the electricity department who have passed into the Army Reserve.

Mr. H. S. Ellis, borough electrical engineer at South Shields, and the remaining 11 eligible employees of the electricity department, have been enrolled in the Army Reserve.

Mr. J. A. Forde, general manager and electrical engineer, Isle of Thanet Electric Tramways and Lighting Company, has attested for military service under Lord Derby's recruiting scheme.

Major Fred Coutts, 5th Black Watch, has received the Territorial Officers' Decoration for twelve years' service. Major Coutts is general manager and electrical engineer to Paisley Tramways.

Mr. S. Antwis, on retiring from the staff of the Wolverhampton Works of the Electric Construction Company, Limited, has been presented by the employees with a purse of Treasury notes. Mr. Antwis has seen 32 years' service.

Mr. T. Hanlon, on leaving the Isle of Thanet Tramways and Lighting Company to take an appointment with the Oxford Tramways Company, has been presented by the staff with a brass gong, suitably inscribed, and a pipe and pouch.

Councillor F. E. Howse, chairman of Wallasey Corporation Tramways Committee, Councillor H. W. Griffin, vice-chairman, Councillors Nesbitt and Quinn, and Mr. R. R. Green, the general manager, have been appointed members of the Munition Committee.

Mr. J. Dairymple, general manager, Glasgow Corporation Tramways, has been agreed upon by Sheffield and Rotherham Tramways Committees as the arbitrator to decide the question of running additional cars for munition workers between the Hadfield works and Tinsley terminus.

The Directorship of Labour Supply.—Mr. James Currie, C.M.G., has been appointed to give effect to the policy of the Labour Supply Department of the Ministry of Munitions in relation to training of munition workers. Mr. Currie was principal of Gordon College, and Director of Education in the Soudan from 1900 to 1914.

Dr. F. S. Pearson, of Great Barrington, Massachusetts, U.S.A., and London, head of the Brazilian Traction Light and Power Company, Barcelona Traction Light and Power Company, Mexico Tramways Company, and other undertakings in Mexico, who was drowned in the *Lusitania* on May 7, has left property in this country of the value of £328,960.

Sir Arthur Yorke, C.B., has been elected a director of the Grand Trunk Railway of Canada to fill the vacancy caused by the death of Lord Welby. Since his retirement from the position of chief inspector in the railway department of the Board of Trade, Sir Arthur has been a director of the Great Western, South Eastern, and London and Chatham Railways.

Mr. W. H. Ellis, assistant mains superintendent of the Corporation Electricity Department, has been appointed by Chester Council to the new office of traffic superintendent of the Chester Electric Tramways, which has been created since the death of Mr. John Gardner. Mr. Ellis is lecturer in electrical engineering at the Chester Grosvenor Museum, and has been in the service of the Corporation for about 18 years. He is a freeman of the city.

Alderman J. H. Aston declined to accept the chairmanship of Huddersfield Tramways Committee for another year, ill-health compelling him to give up some of his public work. Important extensions were made during the time he presided over the committee. The services were increased and improvements were made which have resulted in greatly improved financial records. The committee have expressed regret at his resignation, and placed on record their high appreciation of the service he has rendered during nine years as chairman. Councillor E. H. Sellers, deputy chairman, has been elected chairman, and Councillor T. Cowley vice-chairman.

Mr. Edward Lafferty, traffic manager of Preston Corporation Tramways, has been appointed to a similar position with Edinburgh Tramways Company, at a salary of £300 per annum. Mr. Lafferty served as conductor, driver and timekeeper in Bradford, and he received promotion when steam and electric traction were introduced there, ultimately becoming a traffic inspector. In 1904 he was appointed traffic manager at Preston. In Bradford he served under Mr. C. W. Shepherd, who was traffic superintendent. Subsequently Mr. Shepherd went to Edinburgh to fill a similar position, and he has for some years combined that office with the position of general manager and secretary.

Mr. G. Kidd, general manager, British Columbia Electric Railway, the officers and staff, at the annual meeting of the company in London, were accorded a hearty vote of thanks "for their untiring services in the performance of their very arduous duties." In proposing the resolution, Mr. Harold Brown said that if ever there was a year in which the local management had earned the gratitude and thanks of the stockholders it was the past year. The task of a manager who had to economise in every possible way was difficult and

Digitized by Google

disagreeable. He had to dispense with the services of men who had been in the company's employ for many years; he had to meet the demands of local authorities and the population; and had to refuse to consider things that in the ordinary way they would probably undertake as a matter of course. That was not only disagreeable, but it was calculated to make a general manager most unpopular. Mr. Kidd had faced that disagreeable duty in a very efficient manner. He was supported by a very efficient, though now a comparatively small, staff.

Mr. Thomas Clarkson was re-elected a director of the National Steam Car Company with acclamation. Mr. Aylmer Maude, in proposing the re-election, said Mr. Clarkson was not only the inventor of the company, but the managing director and chairman. The company's success reflected more credit on Mr. Clarkson than was sometimes realised. When the National Steam Car was put on the streets of London there was no very serious opposition, and the most important omnibus company at that time was running very poor motor vehicles. Later on they were met with the formidable competition of the London General Omnibus after it had been re-formed. It was remarkable that so small a company as theirs then was should have kept its feet and lived to submit such a good balance sheet as on the present occasion. That result was chiefly due to the efforts of Mr. Clarkson. The strike trouble was handled by him with promptitude and firmness, and they might congratulate themselves upon coming through it with so little loss. Mr. K. P. Hawksley was also re-elected a director.

Mr. Charles Owen Silvers, assistant manager of Wolverhampton Corporation Tramways, has been appointed general manager and engineer in succession to the late Mr. W. A. Luntley. Alderman S. Craddock, vice-chairman of the Tramways Committee, in proposing Mr. Silvers' appointment, said that he had a unique knowledge of the Lorain tramway system, and during Mr. Luntley's illness he had performed excellent work. The salary will be £350 per annum, rising to £500, and by a rearrangement of the staff the Corporation will effect considerable saving. In 1901 Mr. Silvers was articled to Mr. C. E. Shawfield, at that time the electrical and tramways engineer at Wolverhampton. Mr. Silvers superintended the electrical equipment of the tramways and cars in that town, and was subsequently appointed assistant engineer, in which capacity he had charge of construction and repair work. In 1910–11 he became assistant engineer in the rail welding department of the Tudor Accumulator Company, but in September, 1911, he returned to Wolverhampton as tramways engineer and deputy manager. When Mr. Luntley was laid aside by illness in March last, Mr. Silvers took sole charge.

Mr. Thomas Parker, managing director of Thomas Parker, Limited, died on December 5, at Trowbridge. In 1884 Mr. Parker designed and laid down the electric plant of the Blackpool Tramways. His original business was disposed of in 1888, to the Electric Construction Corporation, to which he acted for five years as engineer and manager. Amongst the contracts carried out under his direction was the electrical equipment of Liverpool Overhead Railway, and he designed Burnley electricity works. He was also concerned in supplying plant to the power stations at Manchester, Oxford, Chester, and Morecambe, and also for Birmingham Tramways Company. Along with the late Dr. Parshall, he was one of the arbitrators appointed to decide upon the system of electrification to be used by the Metropolitan District Railway, and he was consulting engineer to the Metropolitan Railway during electrification.

WITH THE FORCES.

Mr. E. S. Riley, superintendent at the Walthamstow Corporation electricity works, has joined the forces.

Mr. H. Gray, borough electrical engineer, Accrington, is serving with the Accrington and Burnley Howitzer Brigade.

Mr. F. E. Saunders, of Messrs. Balfour, Beattie and Company, Limited, has been gazetted to the Royal Engineers.

Mr. P. L. Gold, Northampton goods agent, Midland Railway, has been gazetted second lieutenant in the Royal Warwickshire Regiment.

Mr. A. Cooper Rawson, owing to his naval duties, has found it necessary to resign his membership of the Highways Committee of London County Council.

Mr. F. B. Mildmay, M.P., who has been elected to the directorate of the Great Western Railway, is serving with the British Expeditionary Force in France as an interpreter. The hon. member is a lieutenant-colonel in the West Kent Yeomanry.

Mr. Cottle, borough surveyor of Douglas, has been congratulated by the Corporation upon being offered a commission as lieutenant in the Royal Engineers. His position is to be kept open for him, and the difference between his salary and the army pay made good.

Electrical Engineers on Service.—In his recent inaugural address to the Institution of Electrical Engineers, Mr. C. P. Sparks, the new president, said that their hearts went out to the 1,500 members who were on active service. The bulk of the 7,000 members of the Institution were engaged in maintaining public services or directly or indirectly in the manufacture of munitions.

Company-Sergeant-Major Lindsay, 4th Loyal North Lancs. Regiment, who has been awarded the distinguished conduct medal for conspicuous bravery in France, was on the staff of the United Electrical Car Company, Limited, at Preston, when the war broke out.

Tramway Engineer as Workshop Officer.—Lieutenant S. W. Carty, late assistant electrical engineer of the Liverpool Corporation Tramways, who for some time past has been workshop officer to a divisional ammunition park in England, is again proceeding to the front. Mr. Carty obtained a commission in December, 1914, and was appointed workshop officer to the Anti-Aircraft Section, British Expeditionary Force, France. He was subsequently appointed workshop officer to the transport at one of the bases.

Colonel Lord Montagu of Beaulieu joined the torpedoed P. and O. liner *Persia* at Marseilles, for conveyance to Bombay, in order to take up a new appointment as inspector of mechanical transport vehicles. As his name did not appear in the first list of passengers saved, fears were expressed that he was one of the victims of the piratical and murderous enemy, but on January 4 news arrived that he had reached Malta after going down with the vessel and being several days in an open boat. Lord Montagu drove the first motor car into Palace Yard, and also gave King Edward his first motor drive. He made an unsuccessful attempt in the House of Lords to upset the resolve of both Houses to impose a road charge on omnibuses using the projected new western outlet from London.

Manager-Engineer's Release Sought.—Aberdare Council have applied to the War Office for the release of Mr. A. J. Abraham, general manager and electrical engineer of the Council's tramways and electricity departments. Mr. Abraham has received a commission in the Sherwood Foresters, and the Council maintain that their undertakings will be in a serious position if he is not returned to them. In the event of a refusal the clerk is to apply for the return of Mr. W. T. Hilder, outside mains superintendent, who has joined the R.E. Application is to be made to the local tribunal to permanently postpone the calling up of Messrs. H. T. Goldsworthy (accountant), A. Watkins (deputy clerk), A. S. Morris (deputy surveyor), and G. D. Morgan (chief clerk, tramways department).

NEW YEAR HONOURS.

Mr. S. E. Palmer, a new baronet, is deputy chairman of the Great Western Railway.

Sir Frederick Banbury, who becomes a member of the Privy Council, is a director of the Great Northern Railway.

Mr. R. Woodburn-Gillan, C.S.I., a recipient of the Order of the Star of India, is president of the Railway Board of India.

Sir Alexander Henderson, Bart., M.P., elevated to the peerage, has for several years been chairman of the Great Central Railway.

Sir Thomas Shaughnessy, K.C.V.O., a new peer, is president of the Canadian Pacific Railway, and a director of several railway companies connected with the Canadian Pacific.

Mr. W. W. Hoy, general manager of Railways and Harbours, Union of South Africa, becomes a Knight Bachelor. Mr. Hoy greatly aided the raising and despatch of General Botha's force against German East Africa.

Colonel H. C. L. Holden, C.B., a member of the Royal Automobile Club, and last year's president of the Institution of Automobile Engineers, has been appointed K.C.B. in recognition of his services during the war. Colonel Holden is assistant director of Supplies and Transport, War Office.

Mr. W. Middlebrook, one of the Members for Leeds, received a knighthood. He has been Mayor of Morley and Lord Mayor of Leeds. In the House of Commons he has rendered excellent service as chairman of Private Bill Committees, and has shown an interest in the question of road charges levied on omnibuses and railless trolley cars.

The Most Hon. the Duke of Devonshire, G.C.V.O., on the occasion of the New Year, was created a Knight of the Garter by the King. On becoming Civil Lord of the Admiralty in the Coalition Ministry, he relinquished the position of chairman of the Furness Railway. In 1912 the Duke was chairman of the United Kingdom Railway Officers' and Servants' Association.

Mr. F. H. Dent, one of the new knights, is general manager to the South Eastern and Chatham Railway Companies' Managing Committee, and was formerly with the London and North Western Railway. During the war he has been a member of the committee entrusted with the management of the railways for the Government, and his services to France have been recognised by the French Government.

Mr. George Franklin, of Sheffield, received a knighthood. Sir George is head of a firm of chartered accountants, of Sheffield and London. He is Pro-Chancellor of Sheffield University, a director of Lanarkshire Tramways Company, British Thomson-Houston Company, and several telephone companies abroad, including Constantinople. He was also chairman of the late National Telephone Company. In 1897-8 he was Lord Mayor of Sheffield, and he has for many years worked for the improvement of education facilities.

Digitized by Google

RAILWAY OFFICERS AND STAFF.

Mr. A. G. Reid has resigned his position as general manager and secretary of Dublin and South Eastern Railway.

Mr. R. J. Patrick has been promoted to the post of district goods manager for the Glasgow and Western District of the Caledonian Railway.

Mr. J. J. Petrie, traffic manager, Midland and Great Northern Joint Railway, has been elected to the board of the Railway Benevolent Institution.

Mr. Frank Potter, general manager, Great Western Railway, has been appointed chairman of the Board of Management of the Railway Benevolent Institution.

Mr. H. Marriott, chief goods manager, Lancashire and Yorkshire Railway, has been re-elected chairman of the Irish and English Goods Traffic Conference for 1916.

Mr. F. Tatlow, principal assistant to the general manager, Midland Railway, has been appointed assistant general manager. His whole career has been with the Midland Company.

Mr. A. B. Richardson, son of Mr. J. Richardson, outdoor locomotive superintendent, London, Brighton and South Coast Railway, has been appointed locomotive superintendent of the Emu Bay Railway, Tasmania.

Mr. W. Slater, deputy assistant goods manager, Lancashire and Yorkshire Railway, has been presented with a silver tea service and a lady's satchel as a wedding gift from the goods manager's office staff at Manchester.

Mr. R. E. L. Mannsell, chief mechanical engineer, South Eastern Railway, has succeeded Mr. A. G. Hill, chief mechanical engineer, Great Eastern Railway, as President of the Institution of Locomotive Engineers for 1916.

Mr. P. P. Higgins, locomotive engineer of the Cyprus Government Railways, has been appointed superintendent of railways and engineer of ways and works in the Cameroons, the captured German West African territory.

Mr. W. H. Morton has been appointed locomotive superintendent of the Midland Great Western Railway, Ireland. Mr. Morton, who has been with the company since 1900, was formerly chief draughtsman to Messrs. Kitson and Company, locomotive builders, Leeds.

Mr. E. Moore has been presented with some valuable gifts and an illuminated address by the chief and district officers of the Great Eastern Railway on retiring from the position of solicitor. The presentation was made by Mr. H. W. Thornton, general manager.

Mr. R. M. Wilson has resigned the position of chairman of the Highland Railway Company, owing to indifferent health and the war work he is doing in the South. Mr. W. Whitelaw, the deputy chairman, has been appointed to the vacancy, while Mr. A. E. Pullar, Perth, has been elected deputy chairman.

Mr. J. A. Hookham, works manager, North Staffordshire Railway, has been appointed locomotive, carriage, and wagon superintendent of that railway. He began his career as a pupil on the London, Chatham and Dover Railway, and in 1900 he was appointed locomotive superintendent of a railway in Brazil, which two years later was taken over by the Government.

Great Western Appointments.—On the retirement of Mr. W. K. Laurence at the end of December from the position of divisional engineer at Bristol, Mr. H. R. K. Woodward, divisional engineer, Shrewsbury, was appointed to the vacancy. Mr. R. C. Sikes, chief assistant at Bristol, has taken the place of Mr. Woodward at Shrewsbury, while Mr. H. Reid goes to Bristol from the staff of the new works engineer.

Sir Herbert Walker and Major H. Holmes, the chief officers of the London and South Western Railway, and the staff and employees in the different departments, were referred to at the annual concert of the city staff in aid of the L. & S.W.R. Orphanage. Mr. G. T Hedge, who presided, said they achieved a wonderful performance in sending out the original Expeditionary Force, and but for the arrival of that force before the stipulated time, who could say what the enemy might not have accomplished.

Engineer and Railway Staff Corps.—The following appointments to the rank of Major were notified on January 1:—Mr. C. J. Bowen Cooke, chief mechanical engineer, London and North Western Railway; Mr. Henry Fowler, chief mechanical engineer, Midland Railway, Mr. J. Black, superintendent, North British Railway; Mr. Gilbert S. Szlumper, assistant to General manager, London and South Western Railway and secretary of Railway Executive Committee. Mr. Szlumper was already a lieutenant in the Hampshire Fortress Engineers.

Mr. Vincent Raven, chief mechanical engineer, North Eastern Railway, is accomplishing excellent work as chief superintendent of the ordnance factories at Woolwich Arsenal, to which position he was appointed on September 20. Reporting to the House of Commons on December 20 on the work of the Ministry of Munitions, Mr. Lloyd George said that in the past Woolwich had been primarily responsible for the assembling of bodies and parts and for the filling of shells, and the dual responsibility unduly delayed matters. The War Office came to the conclusion about the end of August that it would be better to hand over that part of the operation to the Ministry of Munitions. Under the temporary management of the engineer of the North Eastern Railway the manufacture and output of articles for filling at Woolwich had increased in some cases by 60 per cent., and in other cases by 80 per cent., whereas the staff had increased by only 23 per cent. That was only one illustration of his work, which was having a potent effect on the cost and speed of the output.

TRAMWAY AND LIGHT RAILWAY NOTES

BOURNEMOUTH.

TRACK RECONSTRUCTION.

The Board of Trade are offering no objection to the Corporation borrowing £6,000 for the reconstruction of a portion of track between Bournemouth and Poole.

BIRMINGHAM.

TRACK RECONSTRUCTION AND REDUCED SPEED.—OVERTURNING OF A CAR.

The average speed of the Birmingham cars, including stoppages, is eight miles an hour, but where lengths of track are undergoing reconstruction speed for the journey from the city boundary to the centre of Birmingham has been reduced to six or seven miles per hour. Other factors contributing to this decision are the restricted lighting and the employment of many new motormen. At the adjourned inquest, on Dec. 15, on the three persons who died from injuries sustained through a tramcar getting beyond control and overturning at a curve, the jury returned a verdict of accidental death, and expressed their opinion that the motorman misjudged the distance for applying the brakes. At the Board of Trade inquiry the driver said he could not say why the brakes refused to act, unless there was an open circuit or a bad rail. The Inspector (Colonel Druitt): It could not have been a bad rail with that heavy rain. Mr. R. H. Dickinson, rolling-stock engineer, said the brakes were tested after the accident and worked all right. The driver must have been going at too high a speed, and threw the magnetic brake right over, instead of notching it, and, there being no sand to use, that had the effect of picking up the wheels, which went over on to the roadway. At the speed at which the car was said to be travelling, it should have turned the curve if the wheels had been allowed to rotate. For the 40 weeks ended January 1, the car receipts show an increase of £81,504.

BRISTOL.

EMPLOYEES AND THE WAR.—MUNICIPAL TRAMWAYS PROJECT.

One thousand and thirty-nine of the employees of Bristol Tramways and Carriage Company had joined the colours up to December 5, and a large number in addition have registered under Lord Derby's scheme, and been placed in their groups. The Board of Trade have extended to October 31 next the period during which Bristol Corporation are entitled to give notice under Section 43 of the Tramways Act, 1870, of their intention to exercise the option vested in them of purchasing the Bristol Tramways undertaking.

HULL.

REDUCED LIGHTING AND ACCIDENTS.—REDUCTION OF SPEED.—OBSTRUCTION AT RAILWAY CROSSINGS.

Restricted lighting at Hull has resulted in an increase in the number of accident claims presented to the Tramways Committee. Representations have been made to the military authorities on behalf of the Tramways Committee and the traders. Through the medium of the Chief Constable the tramways manager has obtained permission to replace the small coloured route lights on the cars, but in consequence of the strain imposed on the motormen by the darkness speed has been reduced. The Tramways Committee have appointed a sub-committee for the purpose of endeavouring to secure a remedy for the delays to cars entailed by railway shunting over the level crossings. The Lord Mayor (Alderman Hargreaves) stated that the Board of Trade Regulations, made eight or ten years ago, were out of date, and were not applicable to the new railway methods of having trains made up of 70 or 80 trucks passing along so slowly that street traffic was held up for several minutes. Mr. McCombe, the manger, expressed the opinion there was shunting at the crossings that was illegal.

LEEDS.

INCREASED TRAFFIC.—APPLICATION BY EMPLOYEES.

During the 40 weeks ended January 1, the car receipts totalled £355,476, an increase of £27,149 on the corresponding period of 1914. The increasing call on the female population for munition and other workers has resulted in the cars being crowded morning and evening with women and girls. Many extra cars have had to be put on to enable them to reach the factories at 6 a.m. As workpeople's tickets are issued as late as 7.45 a.m., the majority of the workers

Digitized by Google

are enabled to travel at a cheap rate. In common with other employees of the Corporation, the tramwaymen have asked for an addition to their bonus of from 2s. to 3s. a week, but while refusing the application the General Purposes Committee have offered to give facilities for working overtime.

LIVERPOOL.

GIFTS FOR TRAMWAY SOLDIERS.—SERVICE DIFFICULTIES.—BELL BOYS.

For the purpose of providing a Christmas gift for each of the tramwaymen serving with the forces, Liverpool Tramways Committee asked the Corporation to sanction the expenditure of a sum not exceeding £200. A member of the City Council has written to the chairman of the Tramways Committee, suggesting that during the present time of stress double the number of passengers should be permitted on each car. The Corporation allows nine standing passengers in the lower saloon, which brings the total number on a standard car up to 73. In an action in the County Court on December 16, brought in respect of injuries sustained by a passenger through the alleged negligence of a conductor, the jury expressed their opinion that a boy should be stationed on the cars to attend to the starting and stopping, as was the case in Manchester, so as to free the conductor. The "free and enlightened" twelve did not, however, indicate how boys are to be secured at the present time, or how the opposition of the unions is to be overcome. Rightly handled, the Manchester method enables an apprenticeship to car work to be instituted, but in most places the men oppose it because they desire to maintain a high rate of pay for unskilled labour into which many of them drift from other occupations.

MANCHESTER.

SANCTION TO DOUBLING.—WAR COLLECTIONS.—EXTENSIONS OF TIME FOR CONSTRUCTION.

Manchester Tramways Committee have received sanction from the Treasury for expenditure on street improvement and doubling of short lengths of tramways. The latest collection made on the tramcars was for the Serbian children, during the week ended December 25. The sum of £538 was received. Since August, 1914, over £17,000 has been collected on the cars, thanks to the indefatigable efforts of Mr. J. M. McElroy, the general manager, in stirring up the passengers by means of poster appeals. A contemporary, referring to his work, says:—"The figures are a tribute to the ingenuity of Mr. McElroy, who has himself devised each poster and is entirely responsible for the idea. Among war workers he has taken a high place, and all by virtue of attention to the halfpennies which other people had forgotten." The Board of Trade have extended for one year from August 18, 1916, the time given in the Corporation Act of 1911, for the completion of certain tramways.

PORTSMOUTH.

A SUCCESSFUL BONUS SYSTEM.—VOLUNTEER MOTORMEN.

For the three months ended September 30, the motormen and conductors earned bonuses amounting to £276, only one of the 200 men forfeiting the right to participate. The bonus was granted for immunity from accident, as usual, but in addition exceptional services were taken into consideration, as well as the extra hours that had been worked under conditions of abnormal strain and difficulty. In the case of an accident a man only forfeits his bonus when he is proved to be at fault. Seventeen volunteer motormen have been trained, and will work in shifts of not less than four hours.

SHEFFIELD.

PROSPECTIVE TRAFFIC ADDITION.—EMPLOYEES' WAR BONUS.—DISMISSED CONDUCTOR AND HOLIDAY PAY.

Large housing schemes are being put in hand in order to provide for men who are being introduced into the factories and works of Sheffield during the last few weeks of 1915 and the first two months of the present year. The influx should add still further to the great increase that has taken place in 1915-16 in the traffic receipts of tramways and omnibuses. The increase (£49,004 up to January 2) has been exceeded in only one other centre in England, namely, Birmingham. The Tramways Committee have agreed to recommend an increase in the war bonus now paid to their employees. It will involve a sum of £7,000 a year. Judge Benson in December reserved judgment in an action brought against the Corporation by a discharged conductor for wages in lieu of a week's holiday. For the Corporation the contention was advanced that they were entitled to exercise the right of dismissal without rendering themselves liable for a breach of contract or for payment of a week's wages in lieu of holiday. If the man was dismissed in proper form his right under the contract ceased.

YORK.

TRAIL CARS TO RELIEVE OVERCROWDING.

The tramways department have taken delivery of several trail cars that were recently ordered in order to relieve dangerous overcrowding. Certain alterations are being made at termini before the new vehicles are brought into use.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS FOR LETTERS PATENT.

16,770 Indicator for motor vehicles—E. Edwards and D. Richards.
16,779 Train signalling devices—P. Morgan.
16,836 Electro-magnetic driving or transmission gear—A. A. Canton.
16,920 Self-propelled vehicles—G. Watney.
16,961 Railway signals—J. G. Cruikshanks.
16,969 Arrangement for sensitively attaching or suspending under varying loads, axles, wheels, carriages, trams, body frames, seats, machines, and other devices particularly applicable to vehicles—E. B. Killen.
17,119 Covers for the seats of vehicles—H. P. Lake.
17,128 Electrically driven vehicles—British Thomson-Houston Company, Limited (*General Electric Co.*).
17,143 System of railway control—A. R. Craddock.
17,179 Means for indicating the direction of turning of motor cars and other vehicles—E. M. Blake and W. Tipler.
17,204 Metallic wheels for vehicles—W. J. Mellersh-Jackson (*Detroit Pressed Steel Company*).
17,205 Wheels of transport vehicles—W. S. Laycock, Limited, and T. Reid.
17,208 Metallic wheels for vehicles—W. J. Mellersh-Jackson (*Detroit Pressed Steel Company*).
17,261 Solid tires for road vehicles—P. D. Penn.
17,349 Electrical signalling devices—E. A. M. Reid and Callender's Cable and Construction Company, Limited.
17,361 Railway chairs for guard or other rails, points, and crossings—A. H. Laybourne (*S. T. Dutton*).
17,374 Trolley heads for electric tramways—R. H. Hollingsbee and W. H. Cottee.
17,419 Braking devices for electric motors—Maschinenfabrik Oerlikon.
17,565 Direction indicators for road vehicles—G. W. Crane and A. C. Yewdall.
17,575 Detachable wheels of motor road vehicles—T. F. Holloway.
17,602 Means for actuating tramway rail points—R. F. Larke.
17,642 Driving gear, particularly suitable for motor vehicles—F. H. Mingay.
17,652 Monorail systems—P. English.

FOR HIGH-CLASS
CONDENSING PLANT
WRITE TO
THE MIRRLEES WATSON CO., LTD.,
SCOTLAND STREET, GLASGOW.

ORIENTAL
—for every purpose.
When you require highest grade Seamless Steel Tubing for *any* purpose, consult us—we are Specialists in its manufacture, and can effectively meet your every need.
ALSO—our special manufacturing facilities enable us to offer the highest quality goods at the keenest prices—and give prompt deliveries. May we quote you?
ORIENTAL TUBE CO., LTD., WEST BROMWICH.
'Phone—45, West Bromwich. Wires—"Tubes, West Bromwich."
SEAMLESS STEEL TUBES

Digitized by Google

GARROULD'S

TO H.M. WAR OFFICE, H.M. COLONIAL OFFICE, INDIA OFFICE, ST. JOHN AMBULANCE ASSOCIATION, BRITISH RED CROSS SOCIETY, LONDON COUNTY COUNCIL, GUY'S HOSPITAL, &c.

SPECIAL DESIGNS FOR

Women Tramway Conductors & Drivers

ALSO

Railway Ticket Inspectors

COMPLETE COSTUME of Blue Cloth. The Coat lined with wool, with Gilt Initials upon the collar.

Coat, Collar, Cuffs and Skirt are bound with Leather.

2 GUINEAS each

Special Reduction for Quantities of 100 and over. Sample Garment sent for inspection.

A LARGE ORDER for Coats and Skirts has just been completed for

The Great Western Railway Co. . . London and North-Western Railway Co. . . The Metropolitan Tramways, Ltd. &c., &c.

Contractors to Unions, Asylums, for Linens, Prints, Ward Dresses, &c., &c.

E. & R. GARROULD

150 to 162, Edgware Road, London, W.

Telegrams: "Garrould, London."
Telephones: 5320, 5321, 6297 Paddington.

17,691 Electric signalling — International Electric Company, Limited, H. E. R. Roose, and R. G. Le Noir.
17,697 Axles for motor cars—A. Abramson.
17,698 Passenger registers for vehicles—E. Priestman.
17,816 Metallic tire for motor cars—C. R. Sotomayer and C. F. Marcenaro.
17,836 Mechanical starter for motor cars—J. E. Hurst.
17,844 Starting and lighting sets for automobiles—British Thomson-Houston Company (*General Electric Company*).
17,879 Steering gear of motor vehicles—A. Thompson and R. Thompson.
17,923 Automatic train-stopping devices—A. L. Lyttle and C. I. Costello.
17,990 Mounting and swivelling the steering wheels of motor road vehicles—E. Quirk.

SPECIFICATIONS PUBLISHED.

1914.

24,219 Anti-splash guards for motor vehicles—Hutchins.
22,251 Train control systems—Murray.
22,646 Jointing of rails by fishplates—Kerr.
24,190 Petrol engine bearings—Bradshaw.
20,244 Car lighting apparatus—Thomson.
21,561 Brake valve mechanism in connection with control systems of railways—Cowell and McCaughan.
22,893 Magnetic brakes, clutches, etc.—Newton and Newton Brothers (Derby), Limited.

1915.

10,132 Motor vehicle wheel—Dunham.
504 Driving and steering mechanisms for motor vehicles—Smith.
5,786 Lamps for motor vehicles—Dew.
6,820 Brake blocks for railway and tramway vehicles—Chaumont.
609 Mechanism for steering automobiles—Hazard.
4,557 Starting mechanism for motor cars—Fillettaz.
5,355 Double-decked vehicles—Spangler.
5,629 Electric signalling apparatus or indicators—Bobroff and Universal Indicator Company.
5,787 Lamps for motor vehicles—Dew.
5,931 Tire-making machines—Goodyear Tyre and Rubber Company.
10,957 and 10,958 Electric railway systems—Samuel, Slingo, Gunton, and others.
2,133 Brake gear mechanism for tramcars—Gibson and Gibson.
3,419 Electric signalling systems—Stern.
4,531 Road vehicle wheels—Cope and Warland Dual Rim Company.
7,754 Process of and apparatus for sanding rails—Geraghty.
8,376 Safety device for use with electrically-driven vehicles—Turner.
10,366 Fish-joints—Johnsen and Johnsen.
11,707 Motor vehicles—Scott.
12,194 Lifting jacks—Mellersh-Jackson (*American Chain Co.*)

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.		1914. WEEKS ENDED. Dec. 5.	Dec. 12.	Dec. 19.	Dec. 26.	1915. WEEKS ENDED. Dec. 4.	Dec. 11.	Dec. 18.	Dec. 25.	AGGREGATE. Wks.	1915.	Increase or Decrease.
		£	£	£	£	£	£	£	£		£	£
Anglo-Argentine		52,716	52,112	51,634	52,765	51,954	54,110	51,874	52,156	51	2,607,179	−133,550
Auckland		...	(28 days)	20,414	...	...	(28 days)	21,804	...	24	125,840	+ 908
Burma	Rs.	3,595	3,353	3,195	3,115	3,611	3,605	3,551	3,506	...	74,963	+ 6,579
Calcutta	Rs.	63,057	62,189	62,547	62,574	67,400	66,940	67,012	67,838	51	3,361,496	− 29,738
Hong Kong	$	...	...	...	...	...	...	...	...	...	...	...
Madras	Rs.	(14 days)	24,471	(14 days)	31,416	(14 days)	28,666	(14 days)	36,150	50	708,977	+ 42,356

Companies Issuing Monthly Statements.

		1914. July.	August.	Sept.	October.	Nov.	December	1915. July.	August.	Sept.	October.	Nov.	December	Wks.	AGGREGATE. 1915.	+ or −.
		£	£	£	£	£	£	£	£	£	£	£	£		£	£
Brazilian Street Mlrs.		...	...	...	...	...	...	...	...	...	...	...	...	...	—	—
Brazilian Traction Mlrs		6,462,860	6,166,100	6,096,940	6241170	5929730	...	6,703,000	6,576,000	6,494,000	6793000	6336000	...	48	70,586,110	+3,245,122
Brisbane		29,680	33,172	28,031	28,763	...	...	31,150	35,064	30,360	31,880	...	...	44	306,954	+ 18,333
British Columbia	$	690,023	674,812	650,516	661,000	648,485	...	510,723	507,126	517,022	538,826	562,782	...	22	2,636,479	− 688,357
Buenos Aires Pt. & C.		...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze		43,328	40,508	40,333	42,341	42,256	44,000	41,460	41,468	39,355	42,516	42,603	43,528	26	250,930	− 1,836
Cape Town		...	...	...	...	...	...	13,960	...	13,310	...	13,870	...	—	—	—
Carthagena & Herrerias		2,416	2,758	2,175	1,543	1,379	1,255	2,157	1,523	1,252	2,169	2,090	2,129	52	21,968	− 3,354
Cordoba		14,165	13,371	12,384	12,904	12,468	...	14,373	14,157	13,213	13,433	13,785	...	30	111,123	+ 3,784
East India		2,045	2,112	1,980	2,007	2,029	1,839	2,231	2,266	2,054	2,069	2,065	2,062	22	10,516	+ 549
Kalgoorlie		2,552	3,042	2,864	2,525	...	...	2,775	3,165	2,997	2,675	...	...	44	27,791	+ 1,286
La Plata		4,358	4,060	3,598	4,540	4,540	4,452	4,055	4,165	3,894	4,405	4,545	4,564	52	51,400	− 3,984
Lima		34,627	29,898	28,717	30,646	29,712	...	33,344	32,011	30,543	32,208	30,703	...	48	351,169	− 9,612
Manila	$	133,900	128,500	116,300	125,750	129,000	...	123,750	126,650	123,946	124,131	129,447	...	48	1,353,983	− 116,711
Melbourne		...	...	..	...	...	...	63,432	...	...	...	...	...	—	—	—
Mexico	$	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Montevideo		26,417	26,075	25,226	26,500	27,081	28,605	25,161	26,493	25,070	27,167	28,407	31,305	8	59,712	+ 4,026
Port Elizabeth ...		...	...	...	...	...	...	3,362	...	2,927	...	3,110	...	—	—	—
Puebla	$	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Rangoon		4,975	4,629	4,119	4,600	4,405	4,459	4,629	4,510	4,445	4,886	5,028	4,492	52	57,735	− 1,786
Toronto	$	866,221	850,639	879,321	849,636	824,634	...	773,013	762,627	804,902	792,001	851,113	...	48	8,793,719	− 502,658
Winnipeg ...	$	346,630	322,762	310,996	330,562	330,398	...	248,022	251,189	261,982	286,146	323,025	...	48	3,122,620	− 610,281

(*Continued on page 64*)

Digitized by Google

TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1914. WEEKS ENDED. Dec. 5	Dec. 12	Dec. 19	Dec. 26	1915. WEEKS ENDED. Dec. 4	Dec. 11	Dec. 18	Dec. 25	AGGREGATE. Wks.	1915.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	1,551	1,610	1,517	1,551	1,714	1,656	1,670	1,709	29	1,709	+ 158
Accrington Corporation	464	456	446	504	498	500	521	551	38	21,132	+ 545
Ayr Corporation	227	218	221	220	230	234	237	256	32	12,787	+ 711
Bath Electric	*	...	...	...	...	...	...	...	—	—	—
Birkenhead Corporation	1,251	1,219	1,264	1,255	1,284	1,378	1,378	1,422	38½	53,203	+ 4,282
Birmingham Corporation	12,385	12,214	12,759	12,580	14,707	15,850	15,600	14,525	39	550,504	+ 78,449
Blackburn Corporation	1,047	980	1,036	1,061	1,012	1,017	1,026	1,128	39	49,568	− 216
Blackpool and Fleetwood	314	263	270	355	267	244	259	316	51	38,628	− 390
Blackpool Corporation	666	573	540	649	598	656	641	689	39	68,094	+ 1,721
Bolton Corporation	2,397	2,416	2,442	2,726	2,426	2,554	2,606	2,772	39	104,018	− 1,533
Bournemouth Corporation	1,643	1,741	1,849	1,867	1,717	1,701	1,904	2,037	39	83,754	+ 3,876
Bradford Corporation	5,538	5,933	5,667	6,258	5,622	5,746	6,530	6,045	38	251,258	+ 10,165
Brighton Corporation	833	812	830	914	837	875	850	954	38¼	43,909	+ 379
Bristol	8,460	7,920	8,461	9,715	9,776	10,023	10,122	12,698	51½	493,794	+ 53,713
Burnley Corporation	1,336	1,303	1,352	1,656	1,438	1,499	1,526	1,700	39	62,051	+ 1,399
Burton-on-Trent Corporation	285	264	271	308	269	293	271	315	39	11,013	− 403
Bury Corporation	1,127	1,126	1,133	1,295	1,144	1,182	1,216	1,320	38¼	52,525	− 390
Cardiff Corporation	2,483	2,418	2,565	2,676	2,450	2,594	2,578	2,768	38	104,120	− 2,478
Chatham and District	974	987	971	1,087	981	1,016	1,039	1,139	51	59,056	+ 9,586
Chesterfield Corporation	256	243	242	308	243	251	262	273	38	10,337	− 25
Colne Corporation	206	203	211	...	213	223	225	...	—	—	—
Cork Electric	450	424	450	530	439	451	432	496	51	25,457	− 10
Croydon Corporation	1,528	1,564	1,627	1,876	1,506	1,635	1,690	2,009	38	70,859	+ 4,437
Derby Corporation	911	901	942	990	950	1,016	988	1,015	38¾	40,506	+ 1,285
Dover Corporation	220	229	230	238	263	276	267	256	38	12,115	+ 2,142
Dublin and Lucan	121	106	114	283	114	99	105	276	25	3,868	+ 59
Dublin United	5,717	5,495	5,850	6,375	5,624	5,755	5,714	6,938	51	311,437	+ 11,072
Dundee City	1,224	1,239	1,216	1,245	1,280	1,264	1,264	1,331	31¼	43,122	+ 2,297
East Ham Corporation	1,215	1,202	1,211	1,402	1,232	1,325	1,339	1,359	38¼	50,319	+ 5,394
Exeter Corporation	318	306	316	337	306	324	321	392	38	14,647	+ 846
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	19,904	20,147	20,093	20,257	20,997	21,013	21,807	22,290	30	646,360	+ 46,139
Glasgow Subway	1,064	1,073	1,102	1,101	1,233	1,247	1,276	1,246	51	55,033	+ 2,200
Glossop (Urban Elec. Supply Co.)	94	97	101	113	118	127	123	132	52	6,522	+ 328
Halifax Corporation	1,942	1,851	1,831	1,982	1,895	1,812	1,799	2,010	38	85,100	+ 908
Hastings and District	683	724	757	784	667	678	721	849	51	69,283	− 200
Huddersfield Corporation	2,294	2,270	2,281	2,668	2,317	2,385	2,437	2,637	38	103,241	+ 14,342
Hull Corporation	3,002	2,898	3,031	3,095	3,121	3,232	3,176	3,217	38	118,322	− 2,303
Ilford U.D. Council	587	593	595	655	577	614	616	636	38	25,004	+ 2,894
Ilkeston Corporation	113	111	120	123	129	128	128	144	39	5,270	+ 214
Ipswich Corporation	383	384	398	431	441	476	466	499	37	21,264	+ 3,400
Isle of Thanet	263	265	181	307	202	236	217	258	12	3,159	− 968
Kilmarnock Corporation	148	148	144	149	149	149	153	162	32	5,390	+ 171
Lanarkshire	1,651	1,699	1,673	1,726	1,901	1,862	2,007	1,984	51	100,948	+ 6,067
Lancashire United	1,469	1,443	1,459	1,502	1,451	1,482	1,519	1,546	51	87,875	+ 5,265
Leeds City	7,919	8,020	8,003	8,715	8,202	8,483	8,641	8,996	39	345,961	+ 26,002
Leicester Corporation	2,786	2,799	2,873	2,936	3,037	3,241	3,137	3,258	52	156,661	+ 9,621
Leith Corporation	647	653	627	668	695	698	706	749	32	24,648	+ 1,577
Leyton U. D. Council	1,377	1,384	1,323	1,588	1,401	1,493	1,521	1,627	38	61,989	+ 9,120
Liverpool Corporation	12,641	12,446	12,907	13,225	12,671	13,382	13,625	14,283	51¾	684,156	+ 11,804
Llandudno and Colwyn Bay	...	156	159	179	...	168	173	204	3½	628	+ 40
London County Council	*	...	...	...	...	...	...	...	—	—	—
London General Omnibus	*	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	177	170	166	127	133	131	123	167	12½	2,212	− 640
Maidstone Corporation	160	162	160	206	170	180	186	204	38	8,446	+ 254
Manchester Corporation	16,351	16,442	17,061	16,568	16,559	17,289	17,709	17,467	38	689,289	+ 21,732
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	...	...	...	...	—	—	—
Nelson Corporation	150	136	144	192	168	181	174	188	38½	7,527	+ 296
Newcastle-on-Tyne Corporation	5,814	5,624	5,864	6,307	5,609	5,724	5,779	5,920	38	241,754	+ 27,907
Newport (Mon.) Corporation	744	737	737	735	793	849	818	856	39	32,436	+ 731
New St. Helens and District	810	854	836	870	834	892	906	929	25	26,249	+ 2,646
Northampton Corporation	609	563	592	624	591	652	631	794	38¾	28,032	+ 4,918
Nottingham Corporation	3,217	3,148	3,211	3,682	3,397	3,619	3,580	3,804	38	142,936	+ 10,060
Oldham Corporation	1,915	1,938	1,950	2,246	2,022	2,093	2,131	1,978	40	90,710	+ 3,640
Portsmouth Corporation	2,040	2,003	2,089	1,905	1,947	2,030	2,104	1,994	39	96,948	—
Preston Corporation	851	839	806	916	910	977	1,000	1,007	38	37,003	+ 1,476
Provincial	1,873	1,773	1,840	2,025	1,867	1,998	2,028	2,041	12½	25,123	+ 1,409
Reading Corporation	653	656	671	815	699	786	773	867	38	30,461	+ 3,179
Rhondda Tramways	1,097	1,066	1,085	1,110	1,099	1,140	1,150	1,201	51	60,238	− 1,942
Rochdale Corporation	1,401	1,401	1,448	1,713	1,418	1,526	1,542	1,659	37¼	65,869	+ 2,832
Rotherham Corporation	945	948	971	1,219	1,162	1,199	1,216	1,306	39	45,876	+ 5,445
Salford Corporation	4,585	4,629	4,762	4,761	4,759	4,923	5,133	5,193	38¾	201,627	+ 4,876
Sheffield Corporation	7,676	7,779	8,058	8,609	9,029	9,400	9,418	8,830	39½	354,247	+ 48,173
Southampton Corporation	1,210	1,236	1,239	1,364	1,334	1,409	1,416	1,541	38	57,650	+ 6,279
Southend-on-Sea Corporation	629	615	617	695	532	579	587	623	38	31,979	− 8,007
South Metropolitan Tramways	*	...	...	...	...	...	...	...	—	—	—
South Shields Corporation	696	665	698	773	707	737	728	806	38¾	30,792	+ 1,230
Sunderland Corporation	1,357	1,314	1,366	1,553	1,460	1,525	1,472	1,625	39	58,337	+ 739
Sunderland District	519	506	572	552	535	510	449	543	8	4,304	+ 271
Swindon Corporation	171	168	173	192	160	175	179	196	38	7,533	+ 647
Torquay Tramways	347	338	375	388	341	363	386	410	51	27,471	− 398
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	515	517	492	534	474	467	479	505	28	14,925	− 664
Wallasey Corporation	1,073	1,033	1,066	1,087	1,084	1,136	1,144	1,182	38¾	49,727	+ 739
Walsall Corporation	673	651	679	797	725	809	784	881	52	38,533	+ 5,702
Walthamstow U.D. Council	724	709	720	770	704	758	750	806	39	34,915	+ 3,355
Warrington Corporation	438	434	439	515	458	484	469	505	38	17,584	+ 836
West Ham Corporation	2,720	2,793	2,777	3,214	2,808	2,938	3,006	3,280	38	118,835	+ 10,093
Wigan Corporation	1,398	1,349	1,410	1,679	1,416	1,493	1,536	1,625	38	58,749	+ 2,706
Wolverhampton Corporation	1,006	1,022	1,150	1,158	1,129	1,155	1,174	1,373	39	43,995	+ 2,484
Yorkshire (West Riding)	1,316	1,312	1,325	1,728	1,372	1,610	1,460	1,726	52	81,929	+ 6,654

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers).

For Places Abroad—
Thirty Shillings per annum.

Tel. No.: 2948 Gerrard.
Telegraphic Address: "Tramigro," London.

Amberley House,
Norfolk St., W.C.

Digitized by Google

Daimler

Commercial Vehicles

Two and Three Ton Lorries to War Office Standards are now being supplied to Municipalities and Firms engaged on Government contracts.

Orders executed in Rotation.
Make your enquiries NOW.

The Daimler Company, Ltd.,
Coventry.

Depots: London, Birmingham, Bristol, Cardiff, Leeds, Brighton, Manchester, Newcastle, Nottingham

WAR SERVICE Daimler

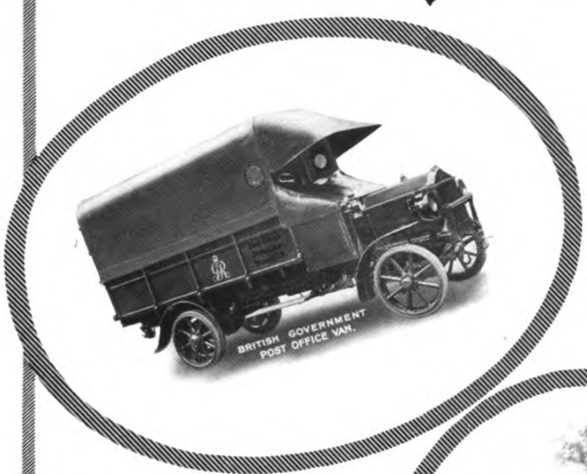
WAR SERVICE Daimler

721

12

Digitized by Google

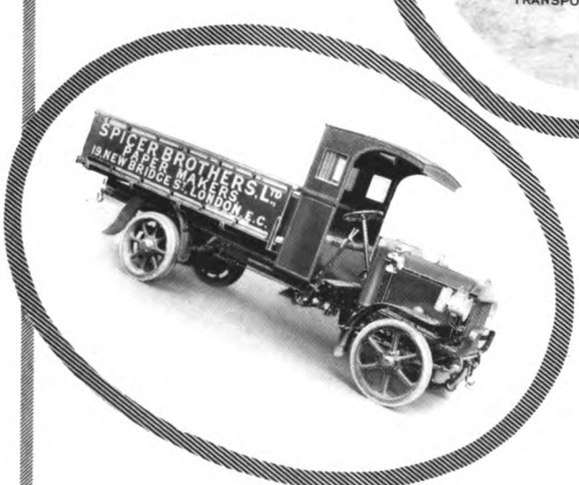
A FEW TYPES OF NAPIER BUSINESS VEHICLES

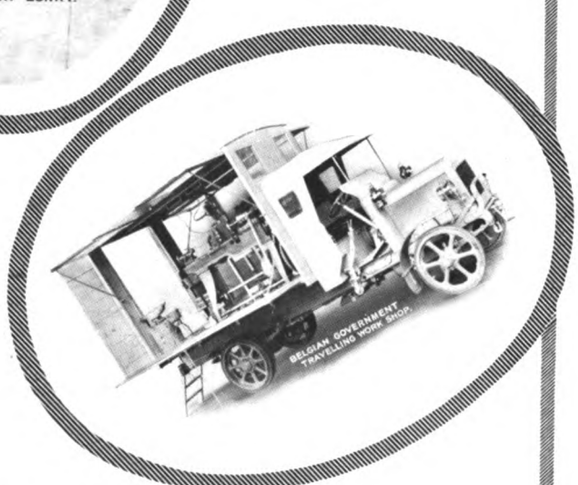


TO CARRY 30-45 CWT.

TO CARRY 3½ TONS.

ENTIRELY BRITISH.





D·NAPIER & SON, LTD
14, NEW BURLINGTON ST., LONDON, W.
WORKS: ACTON, LONDON W.

Digitized by Google

If any readers are under the impression that industrial motor manufacturers are in an enviable position and are doing very well indeed out of the war, it is time that they disabused themselves. At the moment, no doubt, satisfactory profits are in general being made, though it is questionable whether in more than a very few instances these profits are any greater than they would have been had a continuance of business permitted of normal development. We are concerned here with a very young industry, which has only recently passed from the stage of trial and experiment to the assured position that it now occupies. Had the industry been half a century old, and had the change to motor transport been complete and the demand for motors consequently depended only on the need of renewing old stock, the profits would have been fairly steady from year to year. The terms upon which business is done with the Government are strictly reasonable, and under the conditions postulated the result might have been a maintenance of profits, but certainly would have shown little or nothing in the way of excess profits. As things are, the growth of the industry and the expansion of output has proceeded. The capital involved has increased, and the profits have increased with it. Consequently the great majority of the firms engaged in this industry become liable to taxation of what appears to be a substantial excess profit. There is general agreement as to the difficulty of taxing excess profits in an equitable manner, but it is very hard to see how, if the matter is fully considered, there can be any less agreement upon the fact that a young industry under existing arrangements tends to suffer much more severely by taxation than an old one. This is rather unfortunate, since the young industry has not the same support of accumulated funds and prestige, and is less able to bear with impunity a temporary setback. A state of growth in business involves steadily increasing expenditure, and if profits are not allowed to increase appreciably, the whole position becomes very difficult. Particularly is this so when, as in the present instance, the goodwill resulting from past years of honest trading is caused to pass out of the hands of its owners, and to be diverted in the direction of foreign competitors. In the industrial motor industry goodwill is of exceptional importance, inasmuch as the majority of users avoid whenever possible any tendency to accumulate mixed fleets. Consequently if—under the stress of necessity rather than choice—such users, deprived at the outbreak of war of their British machines, and unable to fill the gaps from the same sources, purchase foreign cars, they are thereby given a bias in favour of continuing to increase their fleets by adding yet more foreign vehicles of the same make. To recover goodwill under these difficult circumstances, the British industry will find it necessary to spend money freely, more particularly in connection with the enlargement of sales departments. This is where any unduly severe taxation of profits made during the war would fall very hard.

* * * * * *

The whole of the future position is further complicated by at least one circumstance, in respect of which commercial motor manufacturers are in a unique position. In general, munitions of war are required for immediate and special use, and after use either cease to be of value or at any rate are not in any general demand. The only weapon that returns to the man who throws it is the boomerang, and so far as we are aware this is one of the few implements of war in the renewed or novel use of which the Germans have not set the fashion. Shells, torpedos, and the like do their work and then cease to exist as such. Big guns, and even military rifles, are never likely to be wanted in quantity by the general public. Motor lorries, on the other hand, if well constructed, remain fit for service for a long period. Moreover, the military type is not inherently unsuitable for civilian use. Thus it will inevitably happen that at the termination of war large numbers of second-hand machines will return to this country. We do not as yet know definitely what will be the next step, but it is fairly safe to assume that they will be sold by public auction. This, no doubt, will happen just at a time when manufacturers are having their work cut out to dispose of their much increased outputs of new machines, and herein lies a grave danger to the stability of the whole industry. Meanwhile, it is very doubtful whether the user will ultimately prove a gainer by the transaction. He may get cars at a low price, but it is a questionable matter what service they will give him. Some few no doubt will be in excellent condition, having by chance escaped any very severe work. Others, apparently quite sound, will doubtless have been subjected to reckless handling or rough use, resulting in internal troubles very difficult to detect by the running of the vehicles, or even by careful examination. There will be a very decided element of uncertainty about the quality of these second-hand lorries. Some will succeed; others will prove total failures. As we have already stated,

Digitized by Google

MOTOR TRAFFIC.

the policy of users who decide to purchase these machines will be of doubtful soundness. Incidentally, when things go wrong, manufacturers will probably be quite unjustly blamed. A car may be of first-class construction and design, and yet may have been ruined as a dependable vehicle in the course of a very few months or even weeks of military work. All this constitutes a complication against which manufacturers will have to provide freely, and whether such provision is possible appears to depend largely on the treatment that is meted out to them by those responsible for the assessment of taxation.

* * * * * *

It would be a great thing if some scheme could be devised under which the sale of second-hand vehicles by Government would be regulated. In Germany an arrangement of this kind has already been made, and the army cars will not be thrown upon the market in bulk, but gradually, in lots not so large as seriously to incommode the business of manufacturers. The German method could be improved upon if some scheme could also be embodied under which all the second-hand cars would be thoroughly overhauled before being put upon the market. Were this done, the user would be reasonably safeguarded, and better prices would consequently be paid. The manufacturer, too, would at least in some measure escape the risk of being condemned as a result of the indifferent performance of vehicles originally emanating from his works, but long since passed out of his control.

* * * * * *

Municipal authorities and private traders are alike interested in the rapid development of the use of the electric battery vehicle that has taken place during the past year. Its progress has been attended by the most fortuitous circumstances, and British users and prospective purchasers are most favourably circumstanced in that the movement was initiated by the Municipal Electrical Association. It has been continued under the auspices of the Electric Vehicle Committee of that Association, and, together with their secretary—the indefatigable electrical engineer and tramways manager of Ipswich—every member gives his services in an honorary capacity. Before the outbreak of the war the committee had been in existence only a year, and little propaganda work was undertaken beyond the reading of papers and an exhibition of vehicles. Yet 150 electrics, mostly Edison machines, were working at the end of the twelve months. The war gave the committee and the makers an opportunity of which they have fully taken advantage, and with a year of British practice to guide them, to say nothing of the data available from the United States for several years past, the manufacturers may look back upon the year 1915 with much satisfaction. Particulars for the complete year are not yet available, but up to the end of November the number of machines on the road was 660, the total having thus been quadrupled. Every electric vehicle placed in service has been the means of rendering service in regard to the war. The use of the electrical vehicle, too, has averted extravagant outlays on horses, to say nothing of the saving of time and labour. The two latter factors will become of increasing importance the longer the war lasts. For several months labour has been inadequate in almost every direction. In this aspect of their use electrics have the advantage that a horse-driver can very quickly be trained to manipulate the battery-propelled car, truck, or omnibus.

* * * * * *

American progress in battery or petrol vehicle traction, as far as our information extends, cannot show such rapidity for any year as the past year has effected in this country. A recent announcement of the General Vehicle Company, New York, reminds us that the first practical petrol automobile in the United States was built about 1886, and the first real electric truck fifteen years later, but for neither was there a great demand until 1909. In that year, although battery vehicles were negligible in number in Great Britain, the petrol machine had invaded practically every sphere open to it. The General Vehicle Company adds that their vehicles have demonstrated over ten years' life in hundreds of cases, and have traversed as much as 21,000 miles each per year, proving efficient in hilly cities like Pittsburgh and Cincinnati. Further, they state that each good electric sold eventually sells two more. Recommendation has clearly proved a considerable factor in effecting sales on this side of the Atlantic, and will become increasingly effective during the next few years. The latest development in the United States is the battery exchange system, which has been introduced to power-stations by the Edison Storage Battery Company, New Jersey, as a means of doubling their vehicle load in a few months. Municipal electricity departments in Great Britain possibly might require to obtain legislative sanction before adopting the exchange system, but there is no reason why company undertakings should not experiment with it. In towns where a parcels delivery is worked by the tramways department, a new sphere might be opened up for the light electric vehicle. In several places the increase in the parcels traffic has led to the purchase of motor cars. At Cardiff, Mr. Ellis has stated that great developments might have been made at Christmas with relays of motor cars for collection and delivery. Mr. Ellis is also the city's electrical engineer, and he would therefore be able to find scope for an electric vehicle in the power and lighting department when not required for parcels work. We hope that his committee may be persuaded to make the first provincial experiment in a direction in which electric vehicles are used by railway companies and private firms in London.

ERITH COUNCIL TO RUN OMNIBUSES.

Application has been made by Erith Urban Council to the Board of Trade for a Provisional Order to amend their Tramways Act to enable them to run motor omnibuses inside and outside of the Council's district. An intimation that no objection will be raised by the Board of Trade has been received, and as neighbouring authorities are favourable to the innovation, the tramways department will be able to institute a service as soon as the vehicles can be obtained. Additional means of conveyance are greatly needed in this district of Kent, which is mainly an industrial locality, where war work is in progress. One large firm have for some time been running motor vehicles of their own in order to convey the employees to and from their work. The Erith Council's tramcars run up to the London County Council's system at Abbey Wood, and south of Erith there is the Bexley Urban Council's tramways.

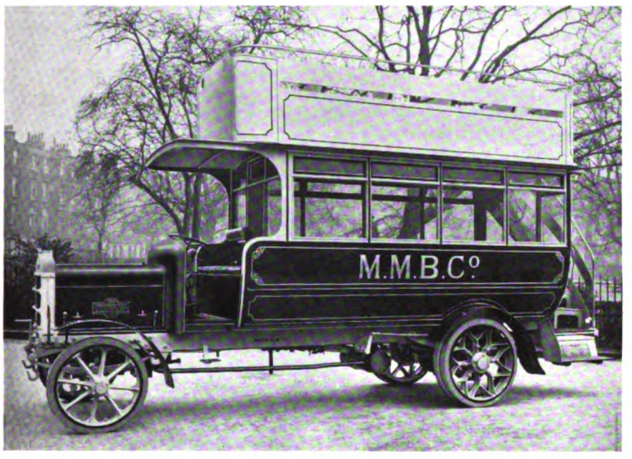
It is understood that Bexley Council are applying for similar powers. No other metropolitan authority has obtained powers to run omnibuses, but a year ago the matter was under discussion at Croydon. Woolwich Council's assent to the Erith application to run the vehicles inside the former district was given subject to their right to make the sanction on such conditions as they might think fit to impose.

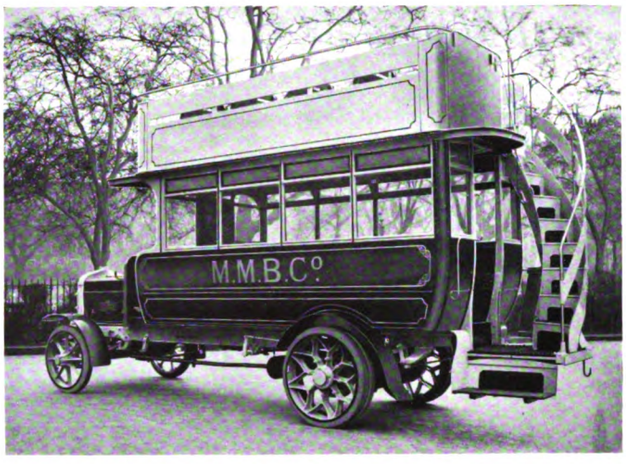
Digitized by Google

MOTOR TRAFFIC.

STRAKER-SQUIRE NEW TYPE OMNIBUS.

The illustrations on this page show a new type of omnibus, a number of which Straker-Squire, Limited, of Nelson Square, Blackfriars, are supplying to the Midland Motor-Bus Company, of Wolverhampton. The chassis is the company's C.O.5 model, designed to carry a load of four tons, excluding the body. This is fitted with a 4-cylinder engine, cylinders cast in pairs, 120 mm. bore and 140 mm. stroke, developing 45 H.P. It is well suited for public service vehicles, is thoroughly reliable, and embodies all the improvements in detail that Messrs. Straker-Squire's long experience with industrial motors have found advisable.





Straker-Squire New Type Omnibus.

Examination of this chassis will reveal its remarkably simple arrangement and accessibility of all working parts. Thus one section can be taken down and removed without interfering with other parts of the chassis, and all parts subjected to exceptional wear or stress quickly and easily replaced. Further, the specification gives evidence of a studious selection of materials, and the careful treatment of these in the manufacture of the small fitments upon which so much depends where a regular service is required.

A new design is utilised for the body. This is constructed to seat 33 passengers. Messrs. E. and H. Hora, of Peckham Road, London, S.E., are the builders. It is constructed throughout with best seasoned timber, with oak and ash framing, mahogany panels glued and canvassed. The side panels are brought right down to the bottom framing, and are carried through the entire length of body, with small arches cut out for the hind wheels. As all the corners are rounded, it will be seen that the body has a very handsome appearance.

The inside seating is arranged partly transverse and partly longitudinal. There are three rows of transverse seats at the front end, double seats on the offside, and single seats on the nearside, both of the garden type. Behind these on each side is a longitudinal seat to take three persons.

The interior is upholstered in Terry velvet, with spring cushions to every seat, and spring squabs to the longitudinal seats, with plain stuffed squabs to the transverse or garden seats. The inside is finished off in three-ply wood polished natural colour, and capped with oak mouldings and mahogany garnish rails, the backs of seats also being polished to match the panelling. The windows are of 3/16th polished plate glass, which is bedded in with rubber and fixed with hard wood slats. Above these windows are folding ventilators with side springs to prevent any of the vibration that previously has always been a cause of annoyance. The frames of these ventilators are of mahogany stained and polished.

As the trap door over the gear box is extra large, and comes underneath the legs of the garden seats, arrangements are made for the legs of such seats to hinge and fold up underneath the seat board. The top deck is constructed with rounded front corners, which is in keeping with the general design of the body, and seats 18 passengers.

The usual entrance platform is provided at the rear for the conductor and, as will be seen from the illustration, there is ample space for the passing of passengers both to the interior and the top deck. Close brass-plated commode handles and brass staircase rail are fitted The body is mounted on chassis on shallow runners and provided with sets of wooden mudguards and forged mild steel stay irons.

OLDHAM CORPORATION OMNIBUSES.

Mr. J. W. Dugdale, general manager, Oldham Corporation Tramways, in his report on the working of the department during the year ended March 31, 1915, gives the following particulars of the two years' working of the three motor omnibuses owned by the tramways department :—

	1915.	1914.
Total borrowing powers ...	£7,200	£7,200
Borrowing powers exercised	£2,500	£2,500
Gross capital expenditure...	£2,640	£2,640
Traffic revenue	£1,301	£1,278
Total revenue	£1,349	£1,342
Working expenses	£1,800	£1,616
Interest (less tax)	£84	£13
Paid to sinking fund ...	£480	—
Net balance (deficiency) ...	£1,015	£805
Miles run	31,899	29,010
Passengers	289,555	304,563
Ratio of working expenses	133·43	122·05
Average revenue per mile	10·15d.	10·958d.
Average expenses per mile	13·548d.	13·37d.
Average fare	1·08d.	1·074d.
Number of omnibuses ...	3	3
Total sinking fund ...	£480	—

The deficiency of £1,015 has been transferred to the tramways reserve fund. Two services have been maintained, the fare stages being a penny and three-halfpence, the latter being for the full journey from the Town Hall to College Road. The service between the tramway terminus at Grain's Bar to Denshaw was opened on August 31, 1914, and "has proved very convenient to the residents of the district and to visitors generally." The Grains Bar tramway service was opened on June 4, 1914, so that one of the omnibus services has proved of value as a feeder.

A Bowser petrol storage tank for the use of the petrol vehicles belonging to the department has been fixed adjacent to the garage in Copsterhill Road. During the past year the motor tower-wagon has attended to 387 emergency calls.

MOTOR AMBULANCES.—The accounts of the British Red Cross Society and the St. John Ambulance Association for the year ended October 31 show that there were 897 motor ambulances at work at the various fronts ; £615,963 had been expended on those vehicles. The number is constantly being added to.

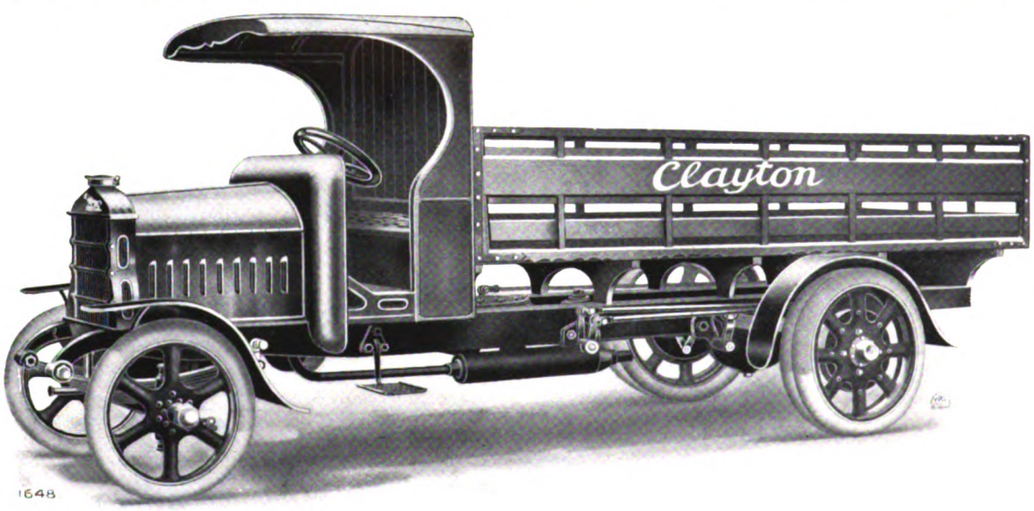
Digitized by Google

MOTOR TRAFFIC.

CLAYTON & SHUTTLEWORTH'S 3-4 TON PETROL CHASSIS.

The traction novelty at the Smithfield Club's Show at the Agricultural Hall, London, this year was the new 3 to 4-ton petrol chassis exhibited by Messrs. Clayton and Shuttleworth, of Stamp End Works, Lincoln. It has been known for some time that this prominent firm of steam vehicle builders were turning attention to petrol machines, but manufacturing difficulties due to the war considerably delayed their plans. As will be seen from the illustration, the chassis was shown complete with a lorry body. It presented a very neat appearance, and at the same time looked of sturdy construction.

The engine is of the vertical 4-cylinder type, cast in pairs 120 mm. by 140 mm., giving approximately 45 B.H.P. at 1,000 revolutions per minute. The water jacket provides an abundant supply of water round the combustion chamber, valves, and cylinders, and is of sufficient length, so that the pistons do not at any part of the stroke pass below it. The base chamber is of cast iron, and the bottom cover containing the main bearing is of aluminium. Gun metal lined with anti-friction alloy is used for the bearings. Large inspection openings fitted with oil-tight covers are provided in the side of the casing. All the valves are placed on the left side of the engine; these are of nickel steel and are operated by one cam shaft.



New 3-4-ton Petrol Chassis by Clayton & Shuttleworth.

Special attention has been given to the method of driving the cam shaft and the shaft serving the magneto, in order to ensure silent running and accessibility. The crank shaft is of oil-tempered steel, specially selected for its resisting power against fatigue, and large bearing surfaces are provided. The speed of the engine is controlled by means of a lever worked on a rack quadrant attached to the dashboard, operating on the throttle valve, the spark advance lever being fixed to the steering column. An accelerator pedal is also provided, acting on the throttle for the more rapid adjustments of speed called for when travelling in traffic. High-tension magneto ignition is fitted, the magneto being readily accessible and worked by the lay shaft through a claw coupling. The Claudel Hobson carburettor is fitted.

The radiator is of the straight tube type, with removable top and bottom, the water pipes being large and arranged to give effective cooling by natural circulation. Lubrication is effected by means of an oil pump driven by skew gearing from the cam shaft, the oil being delivered through service pipes to all the engine bearings. The oil pressure gauge fixed on the dash indicates the pressure of oil and also shows whether the pump is working properly.

There is a cone pattern clutch, made in aluminium and shod with "Ferodo." Between the clutch and the gear box a leather disc form of universal coupling is fitted, thus preventing undue strains when travelling over rough roads. The change speed gear box is of aluminium, arranged for four changes of speed in forward direction and one reverse. It is fitted with ball bearings throughout, the change being made by levers on the gate principle.

The worm drive reduction gear axle is of the full floating type. The road wheels, fitted with plain floating gun-metal bushes, are mounted and revolve on the tubular part of the fixed load-carrying axle. This consists of a tubular section steel stamping, passing underneath and supporting the gear casing. The driving shafts pass through the tubular portion of the dead axle, and have flanges secured to their outer ends that transmit the drive to the road wheels. Thus there is no load carried on either the axle casing or the driving wheels. The drive is transmitted from the propeller shaft by means of a worm and worm wheel to the differential casing. A large inspection cover at the bottom of this casing enables the whole of the gear to be removed without disturbing the rear axle.

A straight steel forging of H section is used for the front axle, with large bearing surfaces for the wheel hubs. The steering levers are of very ample proportions and the coupling rods are fitted with spring loaded caps. The wheels are of the Clayton all-steel pattern, the front 33 in. in diameter and the rear 40 in. diameter, gun-metal floating bushes being fitted to each. Two double-acting brakes are fitted, both operating on the road wheels. These are of the internal expanding type, actuated by a hand lever in one case and a pedal in the other, the brake shoes being all lined with "Ferodo."

Exhaustive trials have been carried out with this vehicle. On each occasion most satisfactory results were obtained. Directly the company are released from their munitions contracts, arrangements will be made to produce the chassis on a large scale.

FODEN STEAM WAGONS IN FRANCE.

A driver in the mechanical transport of the Army Service Corps has sent the following letter to Fodens, Limited, of Sandbach, Cheshire, the builders of the Foden steam wagons:—

"I have been driving one of your 5-ton wagons for eight months. I was in Antwerp and Ostend, also at Locane, Kamel, and Ypres. I find your wagons never fail. The wagon I have been driving has been pulling 19 tons; when I say 19 tons I expect you hardly believe it, but it is quite true. It has been pulling a 6-in. gun, the weight of which is 14 tons, and the wagon also had 5 tons of shells, so that made it just the 19 tons. Another thing about one of your 3-ton wagons. I went fifteen miles one night 'somewhere in France' to pull a 4·7 gun from a ditch; the gun weighed 8 tons. When I got to the place the captain said, 'That engine is no good; I want a traction. You will never get that gun out with that little thing.' I got out and had a look, but after I had had a good look I asked for a chain out of my wagon, which I fastened on to the gun, ran the wagon back, coupled up to the gun, then I got up in the wagon, changed into slow speed, also used double high pressure gear, and a full head of steam, and, to the captain's surprise, the little wagon flew out with the gun."

Omnibuses for Estate Development.—In the absence of railway facilities, the motor omnibus is aiding the development of an estate between Brighton and Newhaven. The South Coast Land and Resort Company announce that there is a half-hourly service running during the season, both from Brighton and Newhaven.

Digitized by Google

MOTOR TRAFFIC.

EDISON ACCUMULATOR CHASSIS.

STANDARDISED MODELS FROM 10 CWT. TO 6 TONS.

That Edison Accumulators, Limited, of Duke Street, Piccadilly, London, have made the most of the exceptional opportunity presented to the electric vehicle by the war is shown by the latest figures issued by the Electric Vehicle Committee. At the end of November the total number of electric conveyances in use was over 660, as compared with 150 twelve months before. The list of users reveals that the great majority of the chassis were supplied by Edison Accumulators, Limited, who executed orders ranging from the runabout to 6-ton automatic tipping wagons. Every variety of use is embraced by the intermediate vehicles, from the 58 light vans of Harrods', Limited, to the omnibuses supplied to York, Southend, South Shields, and West Bromwich Corporations, and Brighton and Loughborough Omnibus Companies. Over fifty are run by five railway companies. Three tramway authorities are using tower wagons, and there is a long list of municipal and electric supply authorities, besides munitions factories and steel and metal works.

Delivery has been made with expedition, and it is becoming increasingly prompt. This is due in a large measure to the standardisation of the G.M. model, every part having been proved a practical success from the standpoint of reliability, whilst the whole gives low operating cost. Two of our illustrations show the elevation and plan view of the 2-ton specimen of this model.

An important consideration is the guarantees that are given. The chassis is warranted for one year against defects due to faulty material or workmanship. Provided the cells be operated and cared for according to the standard instructions, all Edison accumulators are guaranteed to maintain 100 per cent. of their rated capacity for a period of four years from the date of sale, irrespective of the mileage. As regards solid tires, 12,000 miles of satisfactory service is assured provided the vehicle is not overloaded.

Every variety of use is embraced by the light loading capacities of the G.M. model available, viz., 10, 20, and 30 cwt., and 2 to 6 tons. Within those weights there are 24 distinct patterns. There are three separate frame lengths and wheel bases for each load rating. A short, medium, or long body may be chosen for any contemplated service, thus ensuring a proper distribution of weight on front and rear axles, whilst also preventing frame distortion and undue wear and tear of tires, etc., occasioned by permitting the use of an incorrectly loaded machine. The specification of the chassis shown in the illustrations is as appended :—

EDISON ACCUMULATOR MODEL "G.M." ELECTRIC CHASSIS.

DIMENSIONS.—Wheel base, 10 ft.; wheel track, 5 ft. 7¼ in.; maximum body width between wheels, 4 ft. 8 in.; distance from driver's seat to end of frame, 10 ft. 4 in.; distance from rear of battery box to end of frame, 8 ft.; height of frame from ground, 2 ft. 8 in. width of frame, 3 ft. 4 in.; overall length of chassis, 15 ft. 10 in.; overall width of chassis, 6 ft. 7¾ in.

WEIGHT.—Complete chassis without Edison battery, 4,026 lb.

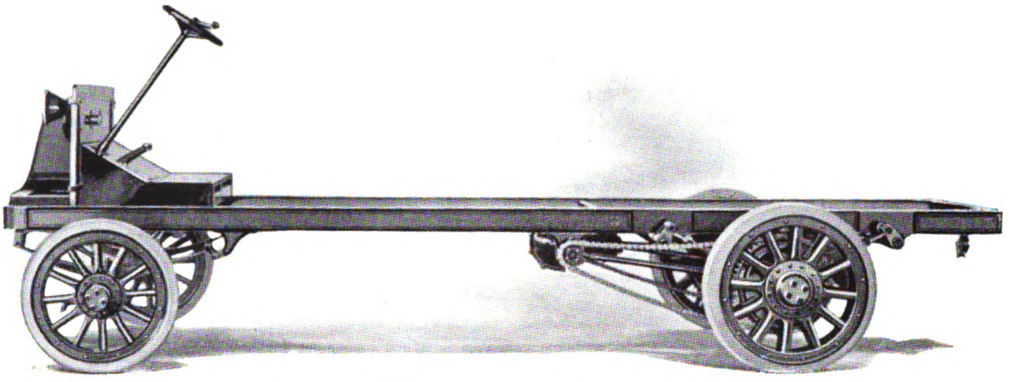
MOTOR RATING.—Normal volts, 60; normal amperes, 40; normal revolutions per minute, 900.

ACCUMULATOR.—Type of cells, A-8; number 60; capacity A.H., 300-340; average volts, 70; K.W.H. output, 24; weight complete, 1,818 lb.; normal charging rate for 7 hours · amperes, 60.

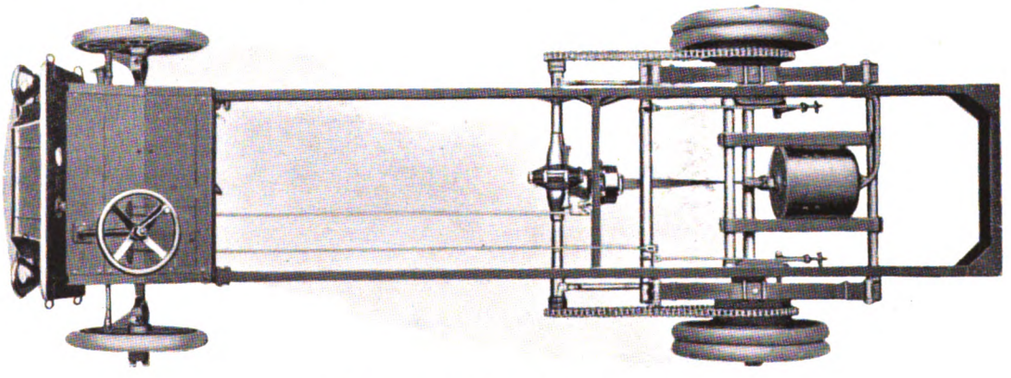
TIRE SIZES.—Front, 820 by 100 mm. single; rear, 900 by 90 mm. twin.

SERVICE DATA.—Speed fully loaded, 11 to 12 miles per hour (speed is calculated on good, hard, level roads); miles per charge, fully loaded, 40, half-load 50; mileage gained by one hour's boost (high rate charge) at twice normal rate, 15.

Special features of the model may be briefly alluded to. There is good suspension under all possible conditions. An accessible and protected position is given the accumulator on the top of the chassis and partly under the driver's seat. Thus the driver or garage man has merely to raise a flap in order to have the whole battery instantly under inspection, while the vehicles may be garaged hub to hub where space is congested, and the absence of side-sway reduces the wear on the tires. The controller, safety switch, ampere-hour meter, and all wire connections are placed under a hood in front of the dashboard. There is a flexible drive from the motor to the countershaft; hence every shock of stopping and starting is cushioned from within the machine. Tire and chassis expenses are thus lessened, and the vehicle starts as smoothly as though controlled by compressed air.



Elevation of Edison 2-ton Chassis—Model G.M.



Plan View of Edison 2-ton Chassis.

Digitized by Google

MOTOR TRAFFIC.

ELECTRIC CHASSIS WITH TIPPING BODY.

Sufficient demonstrations with electric dust trucks have now been given to render local authorities anxious to secure such aids to economical working. The illustrations on this page depict the 40-cwt. vehicles delivered to Dover and Nottingham Corporations for the collection of house and shop refuse.

In each instance automatic tipping gear, electrically operated, is attached to the G.M. chassis model of the Edison Accumulator, Limited, Duke Street, London, S.W., and the bodies supplied to the order of Dover manifest an improvement upon those sent to the inland city in that the height is slightly lower. The body is entirely constructed of sheet steel reinforced with angle and channel sections, hot riveted. The upper sides are hinged so as to allow easy loading. By means of cables and pulleys the sliding panel is automatically raised when the body is tipped, and closed on the body returning to normal position. The whole body is galvanised. The capacity is 35 cubic feet.

The tipping gear is electrically operated and put into action by a simple reversing switch. A small electric motor gives the body a direct thrust backwards through the medium of a reduction gear and square threaded screw of ample proportion.

The body is provided with rollers, which run on a steel runner path of special profile so that when the body is pushed backwards a tilting motion is also given to it. This arrangement possesses the advantage that the bodywork is stable in all positions, whilst the centre of gravity travels almost horizontally; thus the amount of energy used for tipping and the time taken for the process are greatly reduced as compared with other mechanical methods in use for effecting this action.

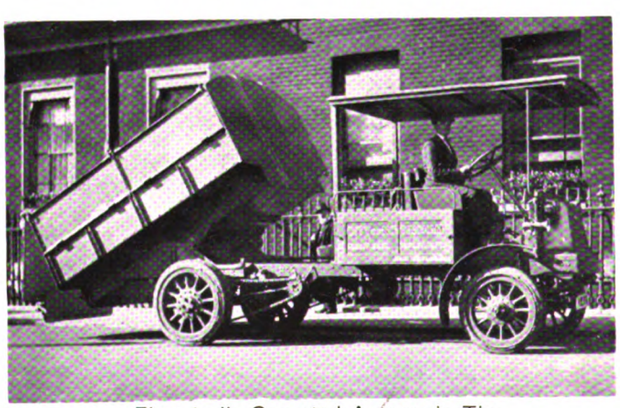
Reference appears in another column to the specifications and advantages of the three patterns in which the 2-ton type of Edison accumulator vehicle is supplied. These provide three lengths of frame and wheel base, namely, short, medium, and long, thereby giving a wide choice to suit every class of service in which battery vehicles can be operated with profit. In such work as dust collection the three lengths enable municipal engineers to provide for successful operation in narrow as well as wide streets. Dover thoroughfares mostly come under the former category, and the firm have a number of similar vehicles on order for other towns with narrow streets.

Power is provided by an Edison battery of 20 cells type A-4, 150 ampere-hours capacity, located in an accessible steel compartment on the top of the chassis and partly under the driver's seat. The motor is specially designed, having high starting torque and high efficiency; it is series wound for 24 volts. The armature is carried on annular ball bearings, and has a capacity sufficient to propel a loaded truck up a 15 per cent. to 25 per cent. grade. The controller is of the drum type, eliminating all arcing in operation.

Edison 2-ton Dust Truck Supplied to Dover Corporation.

Power cannot be applied without first releasing the brake, which automatically closes the circuit switch. Directly the current is off, the brakes will set automatically, and remain set until the circuit breaker is again closed, when the band brake is automatically released. The controller handle is located above, and with its spindle concentric with the steering wheel, thus being always convenient to the driver's hand. This is an important consideration in an emergency, besides obviating the possibility of it being caught by a person's clothing, as may happen with side lever controller handles

Nottingham Corporation's Edison Truck.



Electrically Operated Automatic Tip.

SURVEYORS AND THE LOCOMOTION TAXES.

The Institution of Municipal and County Engineers have asked the Chancellor of the Exchequer to relieve their members of the motor spirit and the local taxation licence duties when carrying out their work of constructing and maintaining roads. The following precedents are quoted in support of the application:—

Under Section 36 of the Highway Act, 1862, highway surveyors were exempt from paying tolls.

The relief granted to physicians and surgeons and proposed to be granted to veterinary surgeons under the Finance Acts.

Inland Revenue officials are exempted from payment of licence duties.

Under the Locomotives Act exemption is given from payments for steam rollers.

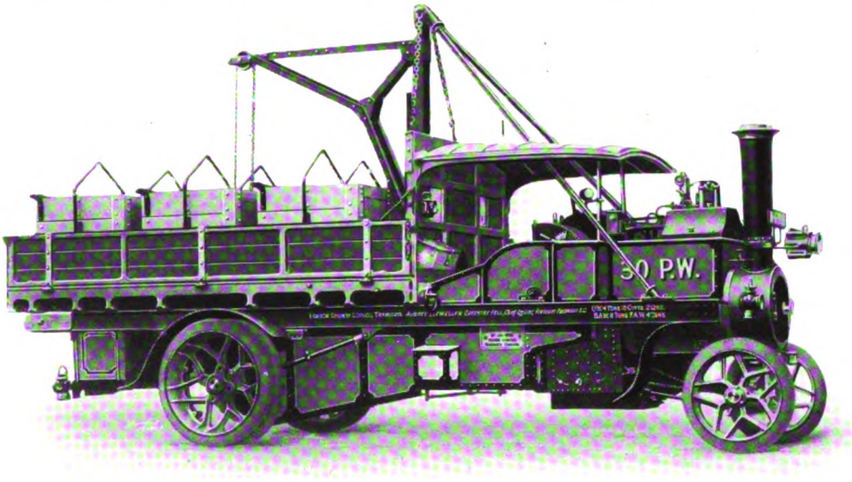
Omnibuses plying for hire pay half the motor spirit duty on the petrol consumed, and reduce their charges still further in this direction by using diluted spirit.

Digitized by Google

MOTOR TRAFFIC.

FODEN WAGONS FOR L.C.C. TRAMWAYS.

The Foden steam wagon illustrated below is one of several recently supplied to the tramways department of the London County Council for use on permanent way work. As will be seen, the special feature of the wagon is the fact that it is fitted with a powerful crane. This adds enormously to the utility of the vehicle, which as a labour saving machine is remarkable. The mechanism of the crane, which is operated by the engine, is of the most simple character, all its movements being easily controlled by the driver from his normal position. All kinds of road material can be rapidly and economically handled, while points, crossings, etc., are conveyed to the job and set in position with a minimum of labour, thus effecting a considerable saving both in time and money. The machine is the standard 5-ton Foden steam wagon, the general design of which is notable for its simplicity and reliability. The boiler is of the horizontal multitubular type, and forms the front of the framework. The sides of the frame are constructed of strong channel steel, tied and braced together in such a manner as to secure great strength in the complete lorry. The platform of the vehicle shown is 12 ft. long by 6 ft. 6 in. wide. Spence Moulton solid rubber tires of a special section are fitted. The wagon is driven by a compound steam engine fixed on the top of the boiler. In this position it is readily accessible and able to work with "dry" steam. The cylinders are 4 in. and 6¾ in. diameter, and are fitted with patent high pressure gear by means of which both cylinders can in case of emergency receive live steam from the boiler, and each exhaust independently into the chimney. The reversing motion is of the ordinary link type, and the whole construction of the engine and steering arrangement is so similar to the Foden traction engine that it is claimed by the makers that any ordinary traction engine driver can easily handle the wagon without having had previous experience with this type of machine. The wagon, which is chain driven, is geared for two speeds—three and six miles per hour—and it is capable of taking a load of 8 tons upon itself and a trailer at six miles per hour on normal roads, or of ascending a gradient of 1 in 6 with its full load at three miles per hour.



Foden Wagon for London County Council's Tramway Department.

MOTOR DRIVERS AND ENLISTMENT.

The Commercial Motor Users' Association recently asked for the residue of drivers of heavy motor vehicles to be placed on the reserve list under the recruiting scheme. It is stated that over 25,000 drivers and mechanics have joined the mechanical transport from the employ of commercial motor owners, and the association urged that it is more economical to enlist men and train them than to dislocate transport work further by offering 6s. a day.

The object sought for by the Council of the Association has been attained, for on December 18 the Board of Trade added the following to the list of reserved occupations in respect of which appeal can be made to the local tribunals:—"Carters, lorrymen, and draymen (horse or power), not engaged in delivering to private houses. This reservation is in addition to the classes of carters, lorrymen, and draymen reserved under specified trades."

THE BRITISH QUANTITY CAR.

PROBLEMS CONFRONTING BRITISH MAKERS.

The appended article from the pen of "J. O.," the well-known motoring correspondent of the *Westminster Gazette*, published in the issue of that journal dated December 28, is worth the consideration of British manufacturers of motor cars for private use.

The *Autocar* is still busy examining the pros and cons of the British quantity car, but the more that is said on the subject the more confusing it becomes. Last week's subscriber to the controversy was "A British Automobile Manufacturer," who is of the opinion that any scheme to be successful should comply with the following conditions: (1) The car must be a fully equipped four-seater of ample power, to sell at £200; and (2) it should be a co-operative product to benefit the trade as a whole. To achieve this result each manufacturer shall devote a portion of his factory to the making of the parts, which would be erected at a central assembling shop owned by the co-operators, who would distribute the cars to the public through agents.

This is, as far as it goes, a sensible suggestion, but unfortunately it only half meets the case. The price is nearly right for a fair-sized four-seater of ample power, but as it is considerably more than is asked for the better class of cheap American machines, such as the Dodge Brothers, Maxwell, and Briscoe, it is doubtful if it can be made to compete with them and others in the same field. If, on the other hand, this £200 model is intended to affront the Ford, then it must fail hopelessly. It is clearly apparent that to succeed in an entirely new enterprise of this kind the trade must determine (1) what is the best value for money America offers in a four-cylinder machine; (2) if this best value for money design is actually the best selling car in its class; and (3) if it is popular in this country and in the Colonies. This settled, the next move is to inquire how closely the selected design can be reproduced at approximately the same price, for it is inconceivable that we can match it for £50 or so less. This is one aspect of the question.

The other and more important aspect is the much cheaper car, one that can successfully compete with the Ford, which sells in this country in greater numbers probably than all the other American machines put together. Here, again, we must accept as our pattern the model which is the cheapest and most popular in this class. We cannot, of course, infringe the Ford patents, but it would be perfectly legitimate to take it as our standard of quality, of weight, and power. The Ford has but two speeds of the epicyclic type, and two speeds should be all-sufficient for the British-built Ford, if the power and weight are about equal. The epicyclic gear can be made in comparatively small quantities for a few pounds a time, and is free for anyone to make. We could not adopt the Ford ignition, but we could produce a system quite as cheap. We could not, perhaps, employ the Ford epicyclic steering, and on this component we must expect to have to pay a little more. A display of ingenuity might produce a simple form of suspension which would reduce the cost of the frame to a few shillings. And we could with advantage freely employ the Ford system of casting the cylinder head and half the crank case in one piece. The reader will say to himself what

Digitized by Google

MOTOR TRAFFIC.

an amazing design the Ford is that we are compelled to look up to it for all our ideas on how to produce a very cheap car. It is, and motor manufacturers in this country and America must know it, even though they are disposed to sneer.

You may call the Ford car a perambulator or a piece of sheet iron or an ironmonger's job, but it is a triumph of cheap production and quality. I have urged this over and over again to try and wake up our manufacturers, but the answer has always been, lack of output. The Ford Company are turning out 250,000 cars a year, they say—how can we get the price down on a paltry few thousands? But the Ford people did not start by producing 250,000 cars a year. As a fact (according to the figures given in the *Motor* of September 7, 1915), when the first Fords were selling in New York City at £105 a time—(this is my own figure)—in 1903–4, the output amounted to only 1,708 machines; in 1905 it was still less—1,695; in 1906 it went down again, to 1,599; but in 1907 it rose to 8,423; and not even as late as 1910 did it touch the 20,000 mark. Can it be that during all these years the company were losing money? No; it is more than likely the organisation was planned from the smallest stages of its development to turn out the Ford car for what it is costing the makers now.

That is a very important point to keep in mind. It may be that in the beginning Mr. Ford was able to carry the science of production for comparatively small lots further than we can hope to do even now with much larger lots, but we must remember that in the manufacture of nearly all things in large quantities there is a point in the cost below which no further economies are possible. This critical period we can only guess at random, and I would myself put the hypothetical figure in the case of light motor cars at 10,000. If this could be accepted as more or less correct, then we can go right ahead with confidence on a machine of the Ford class, because we know we could dispose of the output, assuming that the price, power, accommodation, quality, and equipment are the same.

DENNIS 3-TON SUBSIDY MODEL.

BREAD CONVEYANCE TO WILTSHIRE CAMPS.

The lorry illustrated below has recently been supplied by Dennis Brothers, Limited, of Onslow Works, Guildford, to Messrs. G. Williams and Sons, of Shrewton, Wiltshire. This firm are bakers and contractors to the Government, a circumstance that no doubt explains the opportunity given to them for the purchase of the lorry. The vehicle is of the standard type as supplied to the War Department, and will be used for carrying bread to the various camps in

Dennis Lorry for Military Bread Delivery.

the district and for the carting of flour, etc. It will be noticed that excellent weather accommodation is provided for the driver, as well as the covering for the contents of the lorry.

A full description of the Dennis 3-ton War Office subsidy model, accompanied by six illustrations, was given in our issue dated August 12 last. This type won its place in the subvention scheme as the result of the exhaustive trials carried out a few years ago; and in the trying work that it has been subjected to in France during the past seventeen months the vehicle has added to its laurels. These Dennis conveyances had long before that period established their worth in peace with many prominent firms in this country, and during the long periods of pressure on the railways since the outbreak of war this and heavier models have proved of inestimable benefit both to the Government and private owners.

ALBIONS FOR CIVILIAN USERS.

The Albion Motor Car Company, Limited, while still supplying a large proportion of their output to H.M. War Office for war purposes, state that a limited number of 3 and 4-ton Albion vehicles are now available for civilian users. Among numerous purchasers from whom orders have been received recently are the

32-h.p. 3-Ton Albion Lorry for Glasgow.

North British Locomotive Company, Limited, Glasgow; Union Castle Mail Steamship Company, Limited, London; the Rapid Motor Transport Company, Limited, Glasgow; and Wm. Baird and Company, Limited, Ironworks, Gartsherrie.

CHARGING OF BATTERY VEHICLES.

ESSENTIAL POINTS OF PLUG AND SOCKET STANDARDISED.

The great importance to the electrical and motor vehicle industry of standardising the charging plug and socket used in connection with vehicles propelled by secondary batteries was brought to the notice of the Engineering Standards Committee by the Electrical Vehicle Committee of the Incorporated Municipal Electrical Association in March, 1914. In October of the same year certain proposals for the standardisation of a particular plug and socket, which the latter committee had drawn up and based on the recommendations of the Electrical Vehicle Association of America, were considered in detail. In order, however, not to depart from their guiding principle of interfering as little as possible with invention and progress, the sub-committee, after careful consideration, decided not to suggest, as standard, any detailed design, but to confine their attention to standardising only the essential points necessary to secure interchangeability between any charging plug and any socket of the type selected by the Electric Vehicle Committee (viz., concentric), leaving to them the issue of a detailed specification for the construction of the exact design of plug which, in their opinion, is best suited to the present needs of the industry.

In issuing the standard specification the sub-committee express their indebtedness to the Electric Vehicle Committee for their cordial co-operation in the matter, and it is mentioned that the sub-committee were assisted in the preparation of the specification by Mr. Frank Ayton, hon. sec. of the Electric Vehicle Committee.

The sub-committee have also issued the British standard specification for wall plugs and sockets (five Empire two-pin, without earthing connection), for pressures not exceeding 250 volts. In consultation with the manufacturers the dimensions necessary to obtain interchangeability have been agreed upon, the actual design of the plug being interfered with as little as possible. It is of interest to note that the standard plug is required to have side entry for the flexible wire and a suitable hand shield.

The Reports, the prices of which are 5s. 3d. and 5s. 4d. post free respectively, may be obtained direct from the offices of the committee, 28, Victoria Street, Westminster, S.W.

WIDNES CORPORATION OMNIBUSES.—The Omnibus Committee have reported that the running cost of the motor omnibuses during the past six months was 10·2d. per mile, and the receipts 13d. per mile. An additional vehicle had been ordered.

Digitized by Google

MOTOR TRAFFIC.

A HINT TO PROSPECTIVE PURCHASERS.

Although D. Napier and Son, Limited, are able to supply commercial and public passenger motor vehicles under certain circumstances, orders for private cars cannot at present be executed. In seconding the adoption of the directors' report at the annual meeting held at the works at Acton, on December 20, Mr. H. T. Vane, joint managing director, explained that the delay in executing orders for pleasure vehicles was due to the special Government work that had been entrusted to the company. He hoped that, when this state of affairs terminated, prospective purchasers of motor vehicles would support those British motor manufacturers who, like the Napier Company, had arranged their works at this critical period to suit the urgent requirements of the British Government. He would even say that he hoped the Government would offer some protection, if only temporarily, after the war, to enable such firms to have sufficient time to rearrange their works and organisation for civilian trade.

Mr. Montague Napier, who presided, and moved the adoption of the report, said that practically the whole of the output of Napier vehicles had during the past season been supplied to the British and Allied Governments, and at present the whole of the company's output of Napier chassis was being supplied to the British Government and firms engaged on Government work. The investments, which stood at £13,750, had realised in dividends and interest during the period under review a sum of £1,903, which showed that they were of a remunerative character. The dividend on ordinary shares of 5 per cent. for the twelve months compared with 3 per cent. for the previous sixteen months' trading, and a further £20,000 had been carried to reserve this year, whereas nothing had been placed to reserve in the previous financial period. The fact that the company is a "controlled" establishment should assist in keeping the works fully employed during 1916, and, having regard to the special nature of the work on which the company were now engaged, it should further advance the Napier reputation for high-class work.

The annual report for the year ended September 30 showed a profit of £70,173, after charging all depreciation, but before charging debenture interest (£5,500). Preference share dividend absorbed £22,500, ordinary share dividend £17,500. To the reserve fund £20,000 was added, and £9,839 was carried forward.

SIMPLEX PETROL CARS.

CONTINUED SUCCESS IN INDIA.

At the annual meeting of the East Indian Tramways Company, Mr. John Abbott, the chairman, in submitting the accounts for the year ended July 31, 1915, said that their unique system of tramways was still having as great a success as ever. The net receipts would again have exceeded those of the previous year if the expenses had not been so much greater. This increase was explained by a large increase in their income-tax. He felt very hopeful of the future in view of the fact that the receipts for the first four months of the present year had created a fresh record.

Readers will remember that the East Indian Tramways Company uses cars equipped on the Simplex petrol system, and it also operates road motor vehicles. The Simplex tramcars during the past year ran 599,725 miles at an average running cost of 4·31d. per car-mile, while the receipts were 9·52d. The road vehicles ran 31,708 miles at an average cost of 8·97d., the receipts being 9·99d. The running cost per mile was made up as follows:—Traffic expenses, 1d.; petrol and lubricating oil, 1·44d.; repairs and maintenance, 1·06d.; depreciation, ·81d. The balance available for dividend was £7,149, sufficient to pay a dividend of 5 per cent. on the cumulative preference and ordinary shares, which with the interim dividend of 2½ per cent. paid on May 31, 1914, made 7½ per cent. for the year; and 10 per cent. on the deferred shares, leaving a balance of £104 to be carried forward.

HALLEY'S INDUSTRIAL MOTORS, LTD.

In their report and accounts for the period ended October 2, 1915, upon which date the works were placed under the control of the Minister of Munitions, the directors announce a gross profit of £67,443, to which had to be added £12,030 brought forward. After writing off £7,427 for depreciation, carrying £10,000 to reserve, and placing £25,000 to special reserve against Finance Act legislation and other contingencies due to the war, there remained a balance of £37,046, less £5,250 interim dividend. This was apportioned as follows:—£10,500 to final dividend at 5 per cent. (actual) and a bonus of 1s per share free of income-tax. The balance of £21,296 is to be carried forward to next year, subject to directors' fees and bonus to employees.

NATIONAL STEAM CAR COMPANY LTD.

The report for the year ended October 31 states that, after making provision for all expenses, including maintenance and annual overhauling of the omnibuses, depreciation of plant, tools and buildings, the profit was £33,682. Of this sum £16,500 had been placed to the special reserve for the renewal of omnibuses, leaving a net profit of £17,182. With the amount brought forward of £617, this made a total of £17,800 to be dealt with. The directors had transferred to general reserve fund £3,000, and they recommended a dividend of 6 per cent. on 157,500 £1 shares, which, with the bonus payable to the managing director, would absorb £10,395, leaving a balance to be carried forward of £4 405. For 1914 the dividend was 5 per cent. The average number of omnibuses licensed during the year was 160, and the report stated that the vehicles had been maintained in the highest possible state of efficiency, having regard to the special conditions prevailing on account of the war. The services both in London and Chelmsford had been accorded their fair share of the patronage of the public.

In the balance sheet the total revenue was given as £186,894, and the running expenses £151,840. The nominal capital was £200,000 in £1 shares, of which 157,500 had been issued. The total reserves were given as £56,500. Capital expenditure amounted to £54,309, and the value of the omnibuses, stock of materials, works in progress, lorries, at or under cost, was given as £150,344. Other assets included £24,289 for freehold land and buildings, less amount written off; £19,177 for leasehold land and buildings, less amount written off; £733, furniture, fittings, etc.; and £9,326 cash at bank and in hand.

A SATISFACTORY YEAR.

At the annual meeting on December 30, Mr. T. Clarkson, who presided, said that the sum allocated in respect of overhaul was about 12 per cent. greater, an increase rendered advisable partly in consequence of the rise in cost of material The sum of £3,000 was again carried to general reserve. The carry-forward had been increased to £4,405, compared with £617. The reserves now reached £59,500. The financial position was stronger that day than it had ever been. The profits might have justified them in recommending a larger dividend than 6 per cent., but they had to take into consideration the present difficulties of finance and the developments in the business at Chelmsford. In referring to the strike of some of the employees early in the year, the Chairman said it was curtailed by the dismissal of the disloyal element, and in only a few cases had those men been reinstated. The Commissioner of Police had sanctioned the employment of women conductors, and a start had been made. At Chelmsford they were performing their duties in a most satisfactory manner. The company were executing orders for munitions, and consequently the manufacture of coke motors and the Clarkson wheels was considerably restricted.

THE OUTLOOK FOR HEAVY MOTORS.

He might mention that they were continually being called upon by the authorities to transport the wounded, and there was no doubt that their fleet had in this way and others served very valuable purposes. The orders in hand were sufficient to keep their works engaged night and day for many months to come, notwithstanding the enlargement of their resources, and he had no doubt that for the period of the war they would be working at the extreme limit. The Board had come to the conclusion that on the cessation of hostilities the demand for heavy motor vehicles would be exceedingly large. The war would confirm the opinion he had long felt that heavy motor traction on the roads must increase. At the commencement of the war large numbers of heavy motor vehicles were commandeered. Wastage in this department during the war had been enormous. The orders which firms were unable to execute to-day, owing to their efforts being fixed on munitions production, ran into thousands, and he believed that on the cessation of hostilities the demand upon the immediate resources of the company would keep the works very fully engaged. The report was adopted.

SIDDELEY DEASY AMBULANCES.

At the annual meeting of the Siddeley Deasy Motor Car Company at Coventry on December 20, Sir R. Waldie Griffith (chairman) said that the net profits for nine months were £35,118, and £11,450 was brought forward. A dividend of 1s. per share was proposed, carrying forward £39,468. The works are now solely occupied in producing ambulances and munitions of war for the British Government.

Digitized by Google

MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

MOTOR OWNERS' PETROL COMBINE.—The announcement was made on December 29 that payment of interest on the 6 per cent. first debentures will be deferred.

ELECTRIC DELIVERY VAN.—The Industrial Co-operative Society of Ipswich has ordered a 2½-ton electric battery delivery van from Messrs. Ransomes, Sims and Jefferies, Limited, Ipswich.

LONDON-BIRMINGHAM GOODS SERVICE.—Under the auspices of the Birmingham Garages, Navigation Street, Birmingham, a daily return service has been instituted between that city and London. Six Bessemer motor wagons are utilised, and the delivery of goods is promised within twenty-four hours.

A YEAR OF ELECTRIC VEHICLE PROGRESS.—Electric vehicles now in use in this country number 660, as compared with 150 a year ago. The great majority of these are equipped with Edison accumulators, supplied by Edison Accumulators, Limited, of 2 and 3, Duke Street, London, S.W. Seven tramway authorities own Edison battery vehicles.

REPLACING HORSE TRAMCARS WITH MOTOR OMNIBUSES.—It was announced by the chairman of the Lancaster and District Tramways Company, at the annual meeting recently, that since the war the horse tramways could not be worked at a profit, and he hoped the new motor omnibuses, to be run in conjunction with another company, would be profitable.

AMBULANCE CHASSIS.—Eight tenders for providing twelve ambulance chassis were received by the Metropolitan Asylums Board, but none were from firms who have hitherto supplied those machines. The Board have therefore decided to build six cars similar to two that they themselves constructed in 1913-14. The new cars are required to replace others that are becoming too worn.

PNEUMATIC TIRES FOR HEAVY VEHICLES.—The Goodyear Tyre Company, London, are about to experiment with pneumatic tires up to 12 in. section on heavy commercial vehicles. It is stated that such tires have stood a three years' test in America. A 9 in. tire, it is said, will carry up to 4,500 lb. on the front and rear axle respectively, or a total weight of over four tons, while the 12 in. is equal to 7,500 lb. per axle, or a total of over 6½ tons.

TENDERS FOR MOTOR SPIRIT.—The following tenders were received for the supply of motor spirit to Shoreditch Council:—British Petroleum Company, Limited, Shell 1s. 10d., Shell II. 1s. 9d., Crown 1s. 8d. per gallon (recommended for acceptance); Petrol Users' and Traders' Supply Society, Limited, 1s. 10d.; Anglo-American Oil Company, Limited, Pratt's Perfection 1s. 11d. and 1s. 10d., Pratt's II. 1s. 10d. and 1s. 9d., Taxibus 1s. 9d. and 1s. 8d.

NEW USE FOR A CORPORATION MOTOR OMNIBUS.—A deputation from Bolton Tramways Committee were conveyed to Oldham in a motor omnibus belonging to the tramways department of Bolton. In reporting the visit at a meeting of Oldham Tramways Committee, Councillor F. Elliott, vice-chairman of the latter committee, said the omnibus was one of the most beautiful and serviceable vehicles he had seen. It was used by all the committees, and was let out to the other committees at a cost of 50s. per day, or 5s. per hour.

WOOD-MILNE TIRES IN INDIA.—Although the home demand for Wood-Milne pneumatic and solid tires continues greater than ever, this firm are not neglecting that most important branch of the nation's business, the export trade. Mr. A. D. McHaffie, is responsible for the management of "Wood-Milne" (India), Limited, with branches at Calcutta (70, Bentinck Street) and Bombay (201, Hornby Road), Fort. Mr. McHaffie, who is well-known in Indian motoring circles, sailed in October, and his arrangements are now practically complete.

MOTOR-OMNIBUS COSTS.—Reporting on the running of the motor-omnibuses of Bournemouth Tramways department for the half-year ended September 30, Mr. I. Bulfin, general manager, states that the running expenses showed a decrease from 9·48d. to 9·20d. per car-mile. On the Boscombe to Pier route the receipts averaged 13·28d. per car-mile, as against 15·32d. in the previous year. In the absence of the steamboat excursions the result might be considered satisfactory. From Westbourne Arcade to Alum Chine the receipts averaged 10·71d., as against 7·45d.

MOTOR CONVEYANCES FOR WORKMEN.—An important consideration in the provision of motor transit for workmen by their employers was revealed at an inquest held at Gloucester recently, on the body of a labourer who died from injuries sustained by being run over by a motor chars-a-banc. Deceased was employed by Gloucester Construction Company, who provided a considerable number of motor vehicles to take the men to and from the works. The description of the conveyances varied somewhat, but two were comfortable, covered chars-a-bancs, and to these the workmen were in the habit of making a rush. In such a rush the deceased fell, and his body became pinned under the rear wheel.

MOTOR VEHICLES FOR MUNICIPALITIES.

ERITH COUNCIL have accepted the tender of Dennis Brothers, Limited, to supply a motor fire engine with a ladder attached at a cost not exceeding £895.

SOUTH SHIELDS ELECTRICITY COMMITTEE have advised the Corporation to purchase a battery-propelled vehicle for ash removal at the power-station, at £850.

ERITH URBAN COUNCIL, on obtaining a Provisional Order from the Board of Trade enabling them to run motor omnibuses in connection with their tramways, propose to purchase three such vehicles.

SALFORD COUNCIL have approved of the Electricity Committee's proposal to place a contract with the Albion Motor Car Company, Limited, for the supply of a 4-ton Albion petrol motor wagon, at £775.

NEWCASTLE-ON-TYNE CORPORATION have received a report from the Fire Brigade Committee in favour of purchasing a petrol motor fire engine with a turbine pump from John Morris and Sons, Limited, Manchester.

SYDNEY COUNCIL (N.S.W.) have accepted the tender of Dalgety and Company for the supply of three Baker electric wagons fitted with Edison A10 cells, at £1,180 each, and a 5-6-ton Leyland petrol lorry.

LEEDS EDUCATION COMMITTEE were informed on December 22 that the Gas Committee of the Corporation were obtaining two new motor wagons in order to cope with the difficulties that had arisen in supplying coke to the schools.

EASTBOURNE CORPORATION have ordered ten chassis of the War Office subsidy type from Leyland Motors, Limited. The War Department are permitting the company to execute the order on condition that there is no reduction in the number of vehicles required per week from them for national purposes. The chassis are wanted for the omnibus undertaking.

THE STUDEBAKER CAR.

From Studebaker, Limited, we have received the "Studebaker Proof Book," a profusely illustrated work issued for the purpose of affording proof of the qualities of these well-known motor cars. In a foreword it repudiates the notion not yet extinguished that the output of American factories is necessarily "cheap," in the invidious sense of the word. As a matter of fact, the best types are not, and this finely-printed folder shows "the solid foundation of a great American business enterprise and the perfection which has been achieved in the production of a great American car." The factories of the Studebaker Company cover nearly 150 acres, and the number, size, and diversity of the plant, are little short of marvellous. Sixty thousand cars are made annually. Steel is bought in train-load lots. Two and a quarter million animals have to yield up their hair, and the hides of 150,000 head of cattle are required for upholstery. Two thousand parts go into a car made several times stronger than will be necessary to meet the demands of average service. Amongst the six divisions of the engineering departments are metallographic, chemical, physical, and electrical. How a Studebaker motor is made is deeply interesting, and another attractive study treats of silent gears. Even the mere skimmer of matters mechanical will be delighted with the illustrations, nearly 100 of them, showing different incidents and processes of manufacture, as well as complete cars. A copy of the booklet will be sent without charge on application to Studebaker, Limited, 117-123, Great Portland Street, London, W.

BRITISH WORKMANSHIP IN WAR VEHICLES.—Mr. Geo. W. Watson, on January 12, read a paper on "Live Axles for Commercial Vehicles," at a meeting of the Institution of Automobile Engineers. The author mentioned that any information that was obtainable in regard to experience with the thousands of vehicles with the Expeditionary Force would appear to show that no small percentage of the troubles experienced had related to back axles. British designers and constructors would be pleased to learn that comparatively few failures had occurred with axles entirely of home design and manufacture.

FODEN'S NEW CATALOGUE.—Fodens, Limited, of Sandbach, Cheshire, manufacturers of "Foden" steam wagons, have issued an illustrated catalogue that should be perused by present and prospective users of mechanical traction. The publication is an excellent guide to the many uses to which these machines can be applied. Information is also given on the cost of running and upkeep. The catalogue, which consists of 72 pages of art paper and a cover, is beautifully printed, and it illustrates both the 3-ton and 5-ton models, fitted with various bodies. Copies will be sent by Fodens, Limited, on receipt of application.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 4.] LONDON, SATURDAY, JANUARY 15, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

VICTORIAN STATE RAILWAYS.

The Agent-General for Victoria, Australia, invites Tenders for the supply and delivery at the Port of Melbourne, fully inclusive of Australian Customs Duties, etc., of the following:—

Contract No. 26,111.—Fuse Distribution Boxes and Fuses.

Specifications, Conditions of Contract, and Forms of Tender may be obtained by bona-fide tenderers on application at the offices of the Consulting Engineers, John Coates & Co., Ltd., 115, Victoria Street, London, S.W.

Tenders, accompanied by the preliminary deposit named in the conditions of tendering, must be delivered to the Agent-General for Victoria, Melbourne Place, Strand, W.C., not later than 11 a.m. on Wednesday, February 2, 1916, marked "Tender for Fuse Distribution Boxes and Fuses, Contract 26,111."

The Government of Victoria does not bind itself to accept the lowest or any Tender.

PETER McBRIDE,
Agent-General for Victoria.

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply of Tramcar Passenger Tickets. Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, general manager, Corporation Tramways, 55, Piccadilly, Manchester. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed, "Tender for Tickets," and must be received not later that 10 a.m., on Tuesday, January 25, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
January 14, 1916.

POSITIONS VACANT.

CITY OF SALISBURY.

CITY SURVEYOR'S TEMPORARY ASSISTANT.

The Town Council invite Applications for the appointment of a Temporary Assistant in the office of their City Engineer and Surveyor in consequence of the absence of the present assistant on war service.

Applicants must have had experience in a municipal engineer's office.

The appointment may be determinable at a month's notice.

Applications, in Candidate's own handwriting, stating age, experience, salary required, when able to commence duties, and accompanied by copies of not more than three recent testimonials, endorsed "City Surveyor's Assistant," must reach me not later than noon on Monday, the 24th instant.

Canvassing is strictly prohibited.

FRANCIS HODDING,
Town Clerk.

Municipal Offices, Salisbury.
January 6, 1916.

COUNTY BOROUGH OF WALSALL.

ELECTRIC SUPPLY DEPARTMENT.

APPOINTMENT OF SHIFT ENGINEER.

Applications are invited for the position of Shift Engineer at the Walsall Corporation Electricity Works.

Applicants must have had a sound mechanical and electrical training and must have had previous experience of a similar kind in a large extra high-tension three-phase generating station.

The person engaged will be on war service, but no applications are desired from those so engaged at present, without the full consent of their employers.

Written applications, stating age and wages required and enclosing full particulars of previous experience, together with not more than three recent testimonials, should reach the undersigned not later than January 27.

H. A. HOWIE,
Engineer and Manager.

Electric Supply Department,
Wolverhampton Street, Walsall,
January 11, 1916.

BOROUGH OF SOUTHWARK.

APPOINTMENT OF JUNIOR ENGINEER.

The Council of the Metropolitan Borough of Southwark are prepared to receive Applications for the post of Junior Engineer at their Electric Light Station, Penrose Street, Walworth Road, S.E.

Salary, £2 per week.

Applications, on forms which may be obtained at my office, stating age, experience and qualifications, and accompanied by copies of not more than three testimonials, to be sent in to me, endorsed "Charge Engineer," not later than Monday, January 24, 1916. Those having experience with continuous current preferred. Mechanical and electrical training essential.

Convassing will disqualify.

P. H. GRAY,
Town Clerk.

Town Hall, Walworth Road, S.E.

BOROUGH OF SOUTHWARK.

APPOINTMENT OF CHARGE ENGINEER.

The Council of the Metropolitan Borough of Southwark are prepared to receive applications for the post of Charge Engineer at their Electric Light Station, Penrose Street, Walworth Road, S.E.

Salary, £3 per week.

Applications, on forms which may be obtained at my office, stating age, experience, and qualifications, and accompanied by copies of not more than three testimonials, to be sent in to me, endorsed "Charge Engineer," not later than Monday, January 24, 1916. Canvassing will disqualify. Applicants must have held a similar appointment.

P. H. GRAY,
Town Clerk.

Town Hall, Walworth Road, S.E.

RESIDENT ENGINEER.

Resident Engineer required for combined tramway, lighting, and power property in tropics; must be above military age, single, with turbine, rotary and polyphase distribution experience. Desirable permanent position for the right man.—Apply, J. G. WHITE & CO., LTD., Operating Department, 9, Cloak Lane, London, E.C.

CAR SHED FOREMAN.

Car Shed Foreman. Wanted a good working foreman for Depôt with eighteen cars, B.T.H. and Brush equipment.—State wages, particulars, etc., to Box 266, "Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

ARMATURE WINDER.

Armature Winder wanted immediately for re-winding Traction Motors; long hours and high wages for a good man.—MANAGER, Corporation Tramways, Brighton.

POSITION WANTED.

GENERAL FOREMAN AND FOREMAN PLATELAYER.

General Foreman and Foreman Platelayer, thoroughly experienced in tramway construction and reconstruction and permanent-way repairs desires employment. First class testimonials.—Address, Box 15, "Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

Digitized by Google

Now Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

MEMBER INSTITUTION OF MECHANICAL ENGINEERS; MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND; MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS; MEMBER MUNICIPAL TRAMWAYS ASSOCIATION; FELLOW PERMANENT WAY INSTITUTION.

SOME PRESS OPINIONS:

"The author of this book has produced an excellent book of reference."—*The Engineering Review.*

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school."—*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated."—*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time."—*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management."—*Municipal Journal.*

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Garrould's

TO H.M. WAR OFFICE, H.M. COLONIAL OFFICE, INDIA OFFICE, ST. JOHN AMBULANCE ASSOCIATION, BRITISH RED CROSS SOCIETY, LONDON COUNTY COUNCIL, GUY'S HOSPITAL, &c.

SPECIAL DESIGNS
FOR
WOMEN TRAMWAY CONDUCTORS & DRIVERS
ALSO
Railway Ticket Inspectors.

Complete Costume of Blue Cloth. The Coat lined with wool, with Gilt Initials upon the collar. . .

Coat, Collar, Cuffs, and Skirt are bound with leather. . . . . .

2 Guineas each.

Special Reduction for Quantities of 100 and over. Sample Garment sent - - - for inspection. - - -

***A LARGE ORDER** for Coats and Skirts has just been completed for*

The Great Western Railway Co.,
London and North-Western Railway Co.,
The Metropolitan Tramways, Ltd., &c., &c.

CONTRACTORS to UNIONS, ASYLUMS
FOR
LINENS, PRINTS, WARD DRESSES, &c., &c.

E. & R. GARROULD,
150 to 162, EDGWARE ROAD, LONDON, W.
Telegrams: "Garrould, London."
Telephones: 5320, 5321, 6297 Paddington.

Whenever you are repainting your poles ask for samples of the Kearsley ready-mixed POLE PAINTS as supplied to important Companies at home and abroad. These Paints are durable, retain their colour during exposure, and prevent rust. Information free on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.

Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controllers, Leeds."
Telephone: 3488 Leeds.

OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.

For Places Abroad—Thirty Shillings per annum.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JANUARY 15, 1916.

DEVELOPMENT COMMISSION AND TRANSIT.

Considering the numerous projects in other departments, that the Development Commissioners deal with annually it is not surprising that they have accomplished nothing of note in regard to transit matters. It is unfortunate that the negative side of their labours on traction schemes for five years past should be so pronounced, and the fact that such a result is not so apparent in the other spheres of their work lends support to a suggestion made in these columns three years ago, that that department should be placed in the hands of practical men. The Commission had been in existence three years before the members took steps to examine one of the main questions in relation to transport, namely, the relative merits of light railways and the various forms of motor transport by road, but they do not seem to have made their conclusions public property. In the preceding years they had not been able to set in motion any of the proposals presented to them for assistance, either by making grants or offering loans. It is true that upon the powers conferred by the Development and Road Improvement Act, 1909, Mr. Lloyd George, the Chancellor of the Exchequer, placed an unfortunate restriction. But a body of practical men would have made greater efforts to secure its removal than the Commissioners would seem to have put forward. Mr. George was profuse in acknowledging the need for improved means of rural transport, though in this Act he decreed that no advance could be made to individuals or companies trading for profit. Surely a commercial company is the most practical way of rendering any undertaking a success. The Commissioners apparently have rested satisfied with pointing out the defect, which proved of so glaring a character that only three applications for transport facilities were submitted in 1912. One related to the establishment of a motor-car service and two to light railways. In preceding years some enterprising people in Ireland sought to secure aid for motor services, but came to grief on the point that they could not show that provision would be made for road maintenance. Two years ago hopes that do not seem to have been justified were raised that the defect in the Act would be overcome by forming County Development Associations, in order to promote schemes with the aid of railway and other companies. Since then the County Councils of North Lindsay, Staffordshire, and Flintshire have appeared as parties willing to receive loans to be re-advanced to companies to enable them to construct light railways, but the Treasury decided that this course did not properly meet the rule that no advance could be made to a body trading for profit. By some means, not disclosed in the Report for the year ended March 31 last, arrangements were made for overcoming the obstacle in the case of the Central Buchan Light Railway and the Commissioners offered a grant of £1,000 and a loan not exceeding £44,000 on condition that corresponding amounts were raised from other sources. As this offer was presumably made after the outbreak of the war, it is not surprising to find the Report stating that the question of local contributions remains unsettled. The trading for profit objection has also stifled a light railway project for Strathdon, Aberdeenshire, put forward by a local association. The only other schemes considered related to light railways in connection with the Leinster coal-fields, and loans were recommended, conditional upon the necessary legislation being obtained. The Commissioners close this section of their Report by stating that they have suggested the promotion of legislation to remove the difficulty already referred to. Apparently they are now likely to go beyond mere suggestion, as they state, in their belated Report issued on January 12, that in view of the end of the war bringing a widespread demand for labour-employing works, they are "exploring the preliminary questions that beset and delay the actual start of work" in schemes for light railways, land drainage and reclamation and afforestation. Additional means of locomotion must form the first step towards any scheme of co-operative land settlement.

THE DEMANDS OF LABOUR.

GOVERNMENT LIMITATION TO MUNITION WAGES—INCREASES TO GLASGOW TRAMWAYMEN.

The National Advisory Committee on War Output, which works in co-operation with the Ministry of Munitions, have issued the following statement to several trade unions whose members are engaged in the production of munitions:—

His Majesty's Government have given earnest attention to the financial position of the country, to the great and increasing demands which will still be made upon its resources to meet the needs of the war, and to the imperative need for economy in all forms of expenditure and consumption, both public and private. They have also had regard to the general advances of wages that have already been given since the beginning of the war, and to the measures already taken to tax or limit the profits of undertakings. His Majesty's Government have come to the conclusion that, in view of the pressing emergency, any further advances of wages (other than advances following automatically from existing agreements) should be strictly confined to the adjustment of local conditions where such adjustments are proved to be necessary.

Glasgow Tramways Committee on January 6 recommended an increase of 2s. per week in the wages of motormen and men conductors and all semi-skilled and unskilled workmen in the department, with the exception of carters. Councillor Montgomery, chairman of the Committee, stated that the recommendation did not affect the 2s. bonus in any way. The 2s. increase was to be an increase in their pre-war wages. Councillor Smith Park moved that no increase be granted to the conductors. The general manager had reported that practically all the male conductors who were suitable for becoming drivers were either at the front or were now driving, and there was no necessity for an advance in the wages of conductors. Mr. Dalrymple had had 10,000 applications from women for positions as conductors. Councillor Dollan, in proposing that the advanee be 4s. per week, stated that the manager said an advance of 2s. would be necessary to retain men in the service. Bailie Irwin added that the manager told them he was afraid that the difficulty would be intensified unless there was an advance in wages, and that they would have to consider whether they would give a wage to carry on the business or consider the question of restricting the service. The committee's recommendation was adopted by a large majority, and by an equally decisive vote the

Digitized by Google

Corporation adopted a recommendation to pay an increase of 1s. per week to women conductors with six months' service. They are already receiving 27s. The amendment was that the increase should be 2s.

Sheffield Tramways Committee have recommended, on the application of the Tramways and Vehicle Union, that an additional allowance of 3s. per week be granted to shedmen in the tramways department receiving normal wages of 30s. per week or under, irrespective of any war allowance, and 2s. per week to all men on the traffic and shed staff receiving normal wages over 30s. per week and not exceeding 44s. per week irrespective of any war allowance.

Chesterfield Council have received an application from the National Union of Co-operative Workers that the women conductors should be paid the war bonus. The Tramways Committee have replied that the women commenced duty after the commencement of the war at the maximum rate of pay, and consequently it was not considered that they should receive a bonus.

BRIGHTON OMNIBUS SERVICE.

THE KING V. BRIGHTON CORPORATION.

In the King's Bench Division on January 11 and 12 the case of the King v. Brighton Corporation came on for hearing before the Lord Chief Justice, Mr. Justice Sankey, and Mr. Justice Low. The appended report of the proceedings is from "The Times" Law Report:—

"A rule nisi for a mandamus had been obtained on behalf of Messrs. Thomas Tilling, Ltd., directing the Town Council of the County Borough of Brighton to show cause why they should not hear and determine, according to law, an application by Messrs. Tilling for licences for hackney carriages and omnibuses, on the ground that the Corporation had not properly exercised the discretion which it had under the Town Police Clauses Act, 1847.

"Mr. Montgomery, K.C., and Mr. Rowand Harker appeared for the Town Council; Mr. Macmorran, K.C., and Mr. Barrington-Ward appeared in support of the rule.

"Mr. Montgomery, in opening the case, said that he treated the order as one for a rule nisi for a mandamus, but the proceedings had really begun with a vacation summons. The suggested reason, that the council had not properly exercised their discretion, was no ground for a mandamus.

"From time to time Messrs. Tilling had applied for omnibus licences for Brighton, but the council had always refused them. There was already a company that owned omnibuses at Brighton; and the reason given by the council for refusing licences to Messrs. Tilling was that as the streets were narrow there would be danger to the public if two competing companies were allowed to use them at the same time.

"The contention of Messrs. Tilling now was, in effect, that that was not a sufficient reason for refusal. The borough of Hove adjoined the borough of Brighton, and at Hove licences had been granted to Messrs. Tilling without objection; the omnibuses therefore ran to and fro between Hove and Brighton; but while within the Brighton boundary they did not pick up passengers, so as to avoid the necessity for licences to ply for hire within that boundary.

"A petition, signed by 123 persons residing or carrying on business along the line of route, had been presented in favour of Messrs. Tilling, but the council had not seen fit to accede to it.

"Mr. Montgomery read a number of affidavits on one side or the other dealing with the matter. He submitted that there was no evidence to show that the council had unduly favoured the local company or had not properly dealt with Messrs. Tilling's application. Even if the council had openly acted so as to support a local industry, it was not clear that their decision could have been questioned.

THE DISCRETION OF THE COUNCIL.

"Mr. Macmorran read an affidavit in reply. He submitted that the discretion of the council in dealing with such an application was a discretion which could only be exercised judicially, and a decision which purported to be an exercise of discretion but was really a blind following of a predetermined rule, was not a real decision at all.

"He referred to R. v. Metropolitan Police Commissioner ([1911] 2 K.B., at p. 1,140; 27 'The Times' Law Reports, 573); Reg. v. Barry District Council (16 'The Times' Law Reports, 565); Tinkler v. Wandsworth, &c. (27 L.J., Ch., 342); Wood v. Widnes Corporation ([1898] 1 Q.B., 463; 14 'The Times' Law Reports, 192); and submitted that not only had the council refused to decide the application on its merits, but they had followed a pre-determined rule; the inference from the facts must be that they had acted with bias.

"He then read passages from the minutes of the Watch Committee of the council to show that the council had determined from the first not to allow competition with the existing company. That company purchased about £2,000 worth of electricity yearly from the council, and if owing to competition the company should fail, which was quite likely to happen, the council's electricity undertaking would lose a valuable customer. Admittedly, there was need for additional means of transit; but the council had determined not to allow anyone but the old company to supply it, even though at the time of Messrs. Tilling's application for licences the old company was not in a position to supply it.

"At the time of the application for omnibus licences by Messrs. Tilling there was also an application by them for chars-a-bancs licences. The old company also applied for chars-a-bancs licences, but the council, without having assigned any reason, refused Messrs. Tilling's application and licensed a larger number of vehicles to the old company to make up the number required in the public interest. That proved that throughout the whole of these proceedings the council had acted with a bias against Messrs. Tilling. To stifle competition was not in the public interest, and though the consideration of public safety was important, it must not be put forward as a mere excuse.

"Mr. Montgomery replied. He said that a mandamus should not be granted unless it had been shown that some definite wrong thing had been done; a case of suspicion was not enough.

"The Lord Chief Justice pointed out that so far as the chars-a-bancs licences were concerned the council had not assigned any reason for their action; the Court looked on the matter as one of public concern, and was willing to give leave to file affidavits to answer the case put forward by Mr. Macmorran.

"Mr. Montgomery said that he would accept leave; and the case was accordingly adjourned for a week.

"Solicitors.—Mr. W. J. Wenham, for Messrs. Cushman and Cunningham, Brighton; Messrs. Sharpe, Pritchard, and Co., for Mr. Hugo Talbot, Brighton."

MAINTENANCE OF SERVICES.

Owing to the shortage of labour, Bolton Watch Committee have agreed to allow the general manager of the Corporation Tramways to utilise qualified conductors as motormen without being licensed as both motorman and conductor. The usual driver's fee of 2s. for badge and 1s. for licence will not be exacted in the case of transfers.

Thornley Council have decided to support the Tramways Company in obtaining exemption or postponement from army service of their employees. If any drivers are taken away the service between Wheatley, Thornley, Coxhoe and Durham is threatened with suspension.

Difficulty is being experienced in obtaining paviours and labourers in order to renew the concrete foundation under certain lengths of tramway at Colchester, where work requires to be done at an estimated cost of £1,460. The manager has been directed to continue the temporary repairs until circumstances are favourable for permanent work.

Poole Council have relieved Bournemouth Council of their obligation to maintain the tramway service at its old efficiency so long as the shortage of motormen and the restricted street lighting continues.

At Keighley on January 3 the cars began to give only a 20 minutes service after 9 p.m., the last cars being at 11 p.m. Out of 57 car employees, 45 have not been with the department one year. Twenty-four of the best men have joined the Army.

Of 104 men and boys employed by York Tramways Committee, 40 have gone into the forces and 59 have attested for the reserve. The electricity department has 82 men and boys. Forty-three of the men have attested, and 32 are already serving. Of the attested men 16 have official badges, and will not be called up.

West Hartlepool Tramways manager has made application for postponement to a later group in the cases of motormen who are affected by the first proclamation calling up the Army Reserve.

THE EMPLOYMENT OF WOMEN.

In order to remove any misunderstanding that may arise from the statement made at the January meeting of Belfast City Council that the general manager of the tramways had reported that he was satisfied with the results attending the employment of "boys" as conductors, it may be explained that in Ireland any one of the labouring class up to 70 years is colloquially known as a "boy." What Mr. Nance has done is to employ young men between 16 and 18, and not less than 5 ft. 6 in. in height. This class, he states, has provided 60 per cent. of effectives, whereas the ordinary class of men only gives 15 per cent. From the full report of the Council meeting it appears that Alderman Tyrrell, chairman of the Tramways Committee, stated that these young men are performing their work admirably. It is interesting to note that since the war began the general manager has not taken on any man between 38 and 18, or any who have not resided for six months in Belfast.

Following Belfast City Council's discussion on the resolution of the Tramwaymen's Branch of the National Amalgamated Union of Labour, Mr. George Greig, the organising delegate, has written to the newspapers pointing out that the men at their meeting showed that if it became really necessary to employ women, no objection would be taken. Their resolution simply stated that exception would be taken until it could be proved that a sufficient supply of eligible male labour was unobtainable. Working in harmony with the general manager, the Union agreed to exhaust all efforts in obtaining men conductors. The tramwaymen also decided to assist the management all they could by doing early and late work, and in any other way possible.

Although applications were restricted to women not engaged in the textile trades, the Bradford tramways department have received over 300 applications for twenty positions as conductors.

Women have been engaged for the work of car-cleaning in the daytime at Sheffield, and the Tramways Committee have recommended that they be paid at the same rate per hour as the commencing rate of conductors, and that the general manager be authorised to engage a further number if necessary.

Colchester Council have approved of the steps proposed to be taken by Mr. R. C. Bullough, the tramways manager, for training additional women to act as conductors.

Digitized by Google

CONTROL OF THE TRACK.

Aberdeen Corporation on January 5 discussed the Tramways Committee's recommendation that a remit be made to them to report as to the existing arrangements in connection with the maintenance and repair of the track and permanent way, and as to what alterations or modifications, if any, the committee would recommend should be made.

Councillor Robertson (chairman of the Committee), in moving the recommendation, said the Committee desired:—(1) That a Tramway Sub-Committee of three or four be appointed; (2) the sub-committee to consider any proposals concerning the upkeep of the permanent way before they are submitted to the Tramways Committee; (3) that in carrying out the repairs to the rails the burgh surveyor consult with the general manager of the tramways. The chairman mentioned that large sums had been saved by the Committee investigating reports by the surveyor on proposed repairs.

Bailie Smith, in seconding, said the feeling of the Committee in passing the accounts was that nobody had control over the work.

In moving a direct negative, Councillor Leith, chairman of the Streets and Roads Committee, said that Aberdeen was in the first rank amongst municipal tramways for maintenance. The average cost throughout the United Kingdom was, under managers, 0.62*d.* per car mile; under electrical engineers, 0.55*d.* per mile; and under burgh surveyors, 0.50*d.* per mile. In Aberdeen the cost under the surveyor was 0.33*d.* per mile, or less than two-thirds of the average cost all over the country. The annual cost of permanent way per mile of single track, under the same head, was £168 for the United Kingdom, and £97 for Aberdeen. In two-thirds of the corporations the surveyors had charge of the permanent way. He urged that the new surveyor should be given an opportunity.

Councillor George, in seconding, stated that Mr. Gordon, the new surveyor, had agreed to submit to the tramways department at the beginning of every month the work he proposed to do, and the system should be given a trial.

Councillor Coutts moved, and Councillor Young seconded, an amendment that the matter be remitted to the Tramways Committee and the Streets and Roads Committee jointly for a report. The mover and seconder urged that it was necessary for the Tramways Committee to be in closer touch with the surveyor's department when repairs were to be carried out, and that they could not make up their estimates on repairs when they knew simply nothing about the work.

After further discussion, the Chairman of the Tramways Committee withdrew his motion in favour of the amendment by Councillor Coutts. Dean of Guild Meff remarked that if the tramways manager was given the work of track maintenance, he would probably need an engineer. On a vote the previous question was carried by 18 votes to the 11 recorded for the amendment, so that no change will be made in the present arrangement.

MISCELLANEOUS NEWS AND NOTES.

Controlled Establishments.—The Ministry of Munitions now exercise authority over 2,422 works belonging to companies and individuals.

Passes for Blind People.—Sheffield Tramways Committee have renewed for the current year 169 of the 171 free passes granted to blind people.

Rates and Taxes of Glasgow Tramways.—For the past year Glasgow Tramways department paid £80,229 in local rates, and £40,967 as income tax.

The Radcliffe Accident.—The inquest on the body of the woman who died from injuries sustained by the running away of a car on January 3 has been adjourned to February 1, for the attendance of the motorman, who is now in hospital.

Quartz Glass.—Glass makers in the United States are now exporting quartz glass, made from sand found only in Nebraska. They have discovered the process that before the war was known only in Germany, which country was a regular customer for the sand.

Price for Power at Worcester.—The Corporation Electricity Committee are considering a request received from the Electric Traction Company for a revision of the prices at which power is supplied to the company under the agreement made in 1900.

No Opposition to Private Bills.—January 10 was the last opportunity under the Standing Orders for the presentation of memorials against the further progress of Private Bills, but no objection was raised to any of the 39 Bills on the paper. Under war emergency orders from the Treasury only public works that are absolutely essential can be undertaken.

Pooling of Railway Wagons.—The Coal Mines Organisation Committee, with the assistance of assessors from the Board of Trade, have been engaged in considering the views of various bodies in regard to organising a pooling of railway wagons. A committee of experts on railway transit, etc., have now been requested to draw up a scheme.

Glasgow Tramway Battalion at the Front.—The battalion of tramway employees raised in Glasgow by Mr. J. Dalrymple, the general manager of the Corporation Tramways, is now at the Front. A fund of £500 is being raised to provide comforts. The Tramways Committee have given £50, and over £420 had been placed in the little red boxes on the cars up to January 5.

Improvement of a Newcastle Terminus.—On account of the narrowness of the roadway where the Scotswood terminus is situated, the Tramways Committee have obtained a piece of land in order to construct a loop line. Cars from Newcastle will be able to run along it to the set of rails for the return journey without reversing the trolley pole. The loop can also be utilised for cars waiting to take their return citywards.

Municipal Allowances to Army Officers.—Glasgow Council have terminated the allowances made to their employees holding Army commissions, except in five cases. Bailie Irwin said that taking the case of lieutenants, they had young men who were paid £60 or £80 a year with the Corporation who were now receiving a minimum of 12*s.* 6*d.* per day salary (and field allowance, etc.) The minute aimed at stopping what was nothing short of a scandal.

Trade and Employment After the War.—The Lord Mayor of London, at the request of a large number of business men, has convened a meeting in the Guildhall for January 31, at 3 p.m., to consider the questions of trading and employment conditions after the war. The Lord Mayor invites the co-operation of Chambers of Commerce, patriotic bodies, employers' federations, trade organisations, banks, and railway companies in all parts of the country.

Precedence at the Points.—During the hearing of a charge of drunkenness against a London United Tramways Company's motorman, at West London Police Court, it was stated that there was a collision between his car and a car belonging to London County Council. An inspector said that when a London United car met a L.C.C. car at the points the former had the right of way. Mr. de Grey: Why?—Witness: That is the agreement.—The charge was dismissed.

New Use for a Corporation Motor Omnibus.—A deputation from Bolton Tramways Committee were conveyed to Oldham in a motor omnibus belonging to the Tramways department of Bolton. In reporting the visit at a meeting of Oldham Tramways Committee, Councillor F. Elliott, vice-chairman of the latter committee, said the omnibus was one of the most beautiful and serviceable vehicles he had seen. It was used by all the committees, and was let out to the other committees at a cost of 50*s.* per day, or 5*s.* per hour.

Judgment Against a Tramways Company.—At Wakefield County Court the driver of a mail van was given judgment for £69 17*s.* against the Yorkshire (West Riding) Electric Tramways Company for alleged negligent driving by a motorman. Plaintiff had left his van standing in the road at Horbury while he collected letters from a pillar-box. A tramcar ran into the horse and van, the former being so badly injured that it had to be killed. A denial of liability was put forward by the company, on the ground that as the van stood slantwise its red light was invisible.

Suburban Tramway Scheme at Melbourne.—Mr. V. J. Crowley has presented a report on behalf of the Melbourne, Brunswick, and Coburg tramways conference, on a scheme to construct a tramway to connect the northern and southern suburbs of the city. The terminus would be near the starting point of the South Melborune and Port Melbourne line. Of a total length of 8½ miles, about 5 miles would be double track. The total cost on the overhead trolley system is estimated at £123,900, including £87,260 for permanent way and rails of standard gauge, £19,190 for overhead equipment and feeders, and £10,000 for cars.

Car Collections at Sheffield.—Passengers in the Sheffield tramcars and omnibuses are responding to the silent exhortation of printed posters used by the tramways department to aid the collections for war charities. An instance is the appeal "To Keep the Belgians Alive," that being the heading to the posters announcing the two weeks' collections for the Neutral Commission for Relief in Belgium. In the first week £70 was received, and in the second over £173. With donations since handed in the total has exceeded £251. The placard also contains the announcement that "The Tramways Committee are much gratified by the generous response to their special appeal, and express their appreciation and thanks."

Government Instructions to Coal Owners.—Complaint was made at a meeting of Huddersfield Chamber of Commerce on January 7, that there was a great scarcity of steam coal, and that most peremptory letters had been sent out by the Government ordering that no coal should be sold except for the making of coke or of the residuals that go to the making of high explosives. An inspector had been to the Coal Exchanges at Leeds and Bradford, and had instructed the colliery proprietors that they must not sell any of the coal. The Chamber passed a resolution, stating that unless immediate steps are taken to remove the Government demands, many manufacturers will be obliged to close temporarily or permanently, and in consequence Government orders will be delayed and many workpeople be thrown out of employment.

Action by a Director.—In the King's Bench Division on January 12, Mr. Justice Scrutton gave judgment in the action brought by Miss M. O. L. Wright, who sued as Mrs. Wynstanley, against Messrs. Macartney, McElroy & Co., Ltd., of the Malta Tramways, for damages for wrongful dismissal from the post of secretary, and for a declaration that she was entitled to be a director. The defence was that the dismissal was justified by plaintiff's conduct, and there was a counter-claim against her. His lordship found that as plaintiff legally possessed the shares she had been wrongfully removed, and he awarded her £100 damages. On the counter-claim she was ordered to repay three sums of £800, £90, and £48, which she had received. Neither side, the judge added, would have any costs. Although plaintiff had been held to be still a director the judge advised her to resign at once.

Litigation between Tramway Companies.—At Cheltenham County Court on January 7 an action was heard in which £1 9*s.* 10*d.* was claimed by Bristol Tramways and Carriage Company for damage sustained by one of their motor cabs through being run into by a tramcar belonging to Cheltenham and District Light Railways Company. The cabdriver, after depositing passengers at the railway station, attempted to turn with the car 150 yards away.

Digitized by Google

He estimated its speed at five to six miles an hour, and alleged that the speed was increased to 15-20 miles before the motorman applied the brake. The defence was that the cab did not attempt to turn until the car was within almost its own length, and that there was no possibility of averting the collision. The Judge found there was negligence on the part of defendants, and no contributory negligence on the part of plaintiffs, and he gave judgment for the latter for the amount claimed.

Dismissed Conductor's Holiday Claim.—At Sheffield County Court on January 7, his Honour Judge Benson delivered judgment in the action brought by James Sturt, an ex-conductor, for one week's wages from the Corporation in lieu of a week's holiday. The claim was supported by the Tramway and Vehicle Workers' Union. In 1906 the Corporation passed a resolution granting a week's holiday with pay each year to all workmen, the holiday to be taken between April and October. In 1914 plaintiff had a week's holiday in May, but after the outbreak of war the Council decided that the men whose holidays could not be granted during 1914, on account of the war, would be given a extra holiday the following year, or a week's wages in lieu of holidays. The Tramways Committee decided that where holidays could not be given in 1915 a week's pay would be given. In July, 1915, defendants gave plaintiff notice to leave their service on August 5, no payment being made for the lost week's holiday, although he had served more than twelve months without one. The Judge observed that in the ordinary way a man should receive 52 weeks' wages for 51 weeks' work whereas since his 1914 holiday plaintiff had received only 52 weeks' wages for the full 52 weeks' work. He therefore gave judgment for the plaintiff. Leave to appeal was granted to the Corporation.

PERSONAL.

Mr. E. F. Harris has resigned his position of engineer to Edinburgh Tramways Company in order to take an appointment in London.

Mr. J. B. Feltham, chief assistant in Gloucester Corporation electricity works, has been appointed electrical engineer to Mexborough Council.

Mr. J. E. M. Stewart, who has resigned the post of chief assistant engineer in Leicester Corporation's electricity station, was referred to by Alderman Flint, at the Council's January meeting, as a most capable and loyal servant.

Mr. H. E. A. Cotton has resigned his membership of the Highways Committee of the London County Council. As Mr. Cotton was an additional member of the Committee, his resignation does not create a vacancy.

Mr. G. F. Craven, general manager and engineer, Reading Corporation Tramways, has been refused leave of absence to enable him to undertake immediate military service, but no objection raised to presenting himself for attestation in the Army Reserve.

Professor J. H. Dobson, general manager of Johannesburg Municipal Tramways, and Electric and Gas Supply departments, has been elected President of the Union of South Africa Association of Municipal Electrical Engineers.

Mr. E. Manville, of London and Coventry, President of the Associated British Motor Manufacturers, has consented to serve as a member of the Board of Referees in connection with the excess profits duty.

Mr. F. W. Mozley, chief engineering assistant to Burnley Corporation, and eldest son of Mr. Henry Mozley, general manager of the Corporation Tramways, has joined the newly-formed engineering company of the Artists' Rifles' Officers' Training Corps.

Sir John Courtis, chairman of Cardiff Tramways Committee is a member of the Selection Board for Wales who adjudicate upon the fitness of men desirous of entering the Inns of Court Officers' Training Corps.

Sergeant W. R. Smethurst, 2nd Battalion Royal Sussex Regiment, formerly a motorman with Salford Corporation Tramways, has been congratulated by the Tramways Committee on being awarded the D.C.M. The resolution is to be engrossed on vellum and presented to the sergeant.

Mr. J. D. R. Cox, of Messrs. Babcock & Wilcox, Ltd., has been appointed general manager and engineer of the Edinburgh and District Tramways Company, in succession to Mr. C. W. Shepherd, at a salary of £1,200 per annum. Mr. Cox, who is thirty-five years of age, goes to Edinburgh with a reputation for engineering skill and general energy. After serving an apprenticeship to engineering he was for some time engaged in Glasgow Corporation electricity works, and prior to the war he was assistant commercial manager in Scotland for Messrs. Babcock & Wilcox, Ltd. Soon after the outbreak of the war he joined the Scots Greys, and later received a commission in the R.F.A. Recently he returned home to act for the London manager of Messrs. Babcock & Wilcox during illness.

Mr. C. W. Shepherd has resigned the position of general manager and secretary of the Edinburgh and District Tramways Company. The directors have accepted the resignation with regret and have requested him to retain the position of secretary to the company. In 1913 Mr. Shepherd underwent a severe operation, and has since been in indifferent health. The strain thrown upon him during the war by the enlistment of a large number of men has been so great that he has been reluctantly compelled to resign the position, which he has held for the past nine years. He went to Edinburgh from Bradford thirteen years ago as traffic superintendent, a position he filled for four years, when he was appointed general manager and secretary.

Mr. J. H. Balfour Browne, K.C., who has verbally taken many Tramways Committee chairmen and general managers in hand in Committee rooms of the Houses of Parliament, is retiring from the Parliamentary Bar. He had his first brief there in 1874, and has been leader for the last eight years. Relating some of his experiences Mr. Balfour Browne said :—" Electricity as an illuminant, and also in connection with the distribution of power, has come into existence in my time, and it has now become a huge accomplished fact. Electric traction, too, has begun to drive the steam locomotive to the British Museum. Tramways have spread their metal nets not only over our towns, but over inter-town territories, and, when 'out of town,' sometimes call themselves 'light railways.'"

CONTRACTS AND ORDERS.

Messrs. Nunn & Co. have obtained a contract to supply caps for tramway employees at Colchester at 3*s.* 6½*d.* each.

Rotherham Council have placed the following contract with J. Smith & Co., Ltd., Derby :—Inspectors' trousers, 15*s.* per pair; tunics, 26*s.*; motormen and conductors' trousers, 11*s.* 6*d.* per pair; jackets, 20*s.*

West Bromwich Electricity Committee have been recommended to accept the subjoined tenders :—Motor-driven centrifugal pump, Gwynnes, Ltd.; water softener, Kennicott Water Softener Company; cast-iron pipes, Cochrane & Co., Ltd.; high pressure steam pipes, Babcock & Wilcox, Ltd.

Increased Charge for Tickets.—The contractors for the supply of tickets to Colchester Tramways department having refused to execute an order for 300,000 urgently required, unless an additional 1*d.* per 1,000 was paid, the Tramways Committee have resolved to pay the additional amount under protest.

London County Council have accepted the subjoined contracts for the supply of electric lamps :—Edison & Swan United Electric Light Co., items 1-7 (carbon filament lamps); Cryselco (Ltd.) items 8-27 (metallic filament lamps, with filaments not of drawn wire); Corona Lamp Works, items 8-13, 18-21 and 26 (metallic filament lamps, with filaments of drawn wire).

Leicester Electricity Committee have recommended the acceptance of the following tenders: Siemens Bros. Dynamo Works, Ltd., 1,000-kw. rotary converter and switchgear cables, etc., £2,450; British Electric Transformer Co., Ltd., set of 100-kw. transformers, one spare transformer, one 75-kw. single-phase transformer, and one 50-kw. single-phase transformer, £312; G. Fletcher & Co., Ltd., coal-handling plant, £1,952.

Stockport Council have placed contracts for tramway supplies as appended :—Hex. nuts, glue, bolts and nuts, Baxendale & Co.; timber, birch floor laths, lifeguards laths, Wilson, Roscoe & Robinson; steel banding wire, British Westinghouse Co.; field coils for motors, Dick, Kerr & Co., Ltd.; bell pushes, P. and B. tape, L. Andrew and Co.; hand slipper bracket castings and car step bracket castings, Malleable Steel Castings Co.

Shepherd's Parging Block Company, Ltd., of Milkstone, Rochdale, inform us that the following among other tramways are now using their parging blocks :—Belfast, Bexley, Blackburn, Bolton, Bradford, Burnley, Chester, Colne, Coventry, Darwen, Eccles, Haslingden, Heywood, Ilkeston, Liverpool, Maidstone, Milnrow, Nelson, Oldham, Portsmouth, Preston, Rawtenstall, Rochdale, Rotherham, Salford, Sheffield, Stalybridge, West Hartlepool, Wigan Corporation; St. Annes and Lytham Tramways, South Lancashire Electric Tramways, and Yorkshire Electric Tramways. Orders are also in hand from Doncaster, Gloucester, and Scarborough Corporations.

Keighley Council have adopted the Tramways Committee's recommendation to accept the offer of Messrs. Clough, Smith & Co., Ltd., to construct the overhead equipment for trolley vehicles from the terminus in Hebden Road, Haworth, to Lowertown, Oxenhope, capital payment to be suspended until six months after the end of the war. The materials will be from the experimental line erected at Hove by "Cedes" Electric Traction, 112, Great Portland Street, London, the price being very favourable in view of the present high cost of materials and labour. The Local Government Board have extended the period for the completion of the overhead equipment on the Oxenhope route until August 7, 1917.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

FINANCIAL REPORTS AND MEETINGS.

Dublin United Tramways Company.—The directors announce a dividend of 5 per cent. per annum (5s. per share) on ordinary shares for the past half-year. £5,000 is placed to the reserve and renewal fund; £18,000 for renewal of rails; and £13,045 is carried forward.

Suggested Suspension of Loan Repayments.—Morley Council have asked Sir W. Middlebrook, M.P., to see the Local Government Board in regard to a suggestion that an Order be made suspending for one year the annual payments towards the extinction of loans.

Yorkshire (West Riding) Electric Tramways Company.—The net revenue for the past year amounted to £29,310, and £10,725 was brought forward. The directors set aside £12,962 for depreciation, and recommend a dividend of 6 per cent. on the preference shares, carrying forward £15,054. The number of passengers carried was 11,602,483, and the miles run 7,763,702, against 10,716,858 and 1,778,509 respectively for the previous year.

A Record Week at Glasgow.—For the seven days ended at midnight on January 8 the tramway receipts were £24,236, a record for a week. For the preceding week the total was £22,774. The previous record was for the week ended September 18, with £23,117, while prior to that the record was made in the New Year week of 1913, when £23,078 was received. Compared with the corresponding week of last year the new record shows an increase of over £3,000.

Buenos Ayres Lacroze Tramways Company.—The report for the year to June 30 last states that the gross receipts amounted to $6,100,652, a decrease of $321,820. The working expenses amounted to $3,760,781, a decrease of $222,882, leaving as net profits on working $2,339,870. Deducting debenture interests, amortization of municipal concession, preliminary expenses of issues, and payment for paving, there remains a balance of $1,191,911, which, added to $16,875 brought forward, forms a total of $1,208,789, which the board propose should be distributed as follows: 5 per cent. to reserve fund, $59,595; 5 per cent. to directors, $59,595; ½ per cent. to syndic, $5,959; to the shareholders, $1,000,000; carried to next account, $83,638. The distribution is equal to 4 per cent., as compared with 5 per cent. for the preceding year. Although the cost of coal had increased the percentage of working expenses was lower owing to economy effected in various ways without detriment to the service.

London Electric Railways and Omnibus Companies.—In accordance with the power obtained last session under the London Electric Railways Facilities Bill, the directors have published the particulars of a proposed pooling agreement, under which the surplus earnings of each of the contracting parties will be paid into a common fund each half-year, to be distributed in the following proportions:—City and South London, 6 per cent.; Central London, 20 per cent.; London Electric, 30 per cent.; Metropolitan District, 12 per cent.; London General Omnibus, 32 per cent. In each case the surplus will be the earnings remaining after payment of all prior charges, including interest on preference stocks and making due allowance for depreciation and reserve. It will be remembered that when the Bill came before the Select Committee, the London County Council opposed with the view of getting the Bill so amended as to provide (1) that any agreement should be subject to the approval of the Board of Trade, and that the Council should be afforded an opportunity of submitting its views thereon; (2) that the receipts from and payments into the common fund by any company should be shown in the accounts of the company, and that the Act should only remain in force for three years. The Committee passed the Bill with an amendment providing that every pooling agreement made under the Bill should be deposited with the Board of Trade, and if the Board of Trade so ordered should be published in such manner as the Board should direct.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

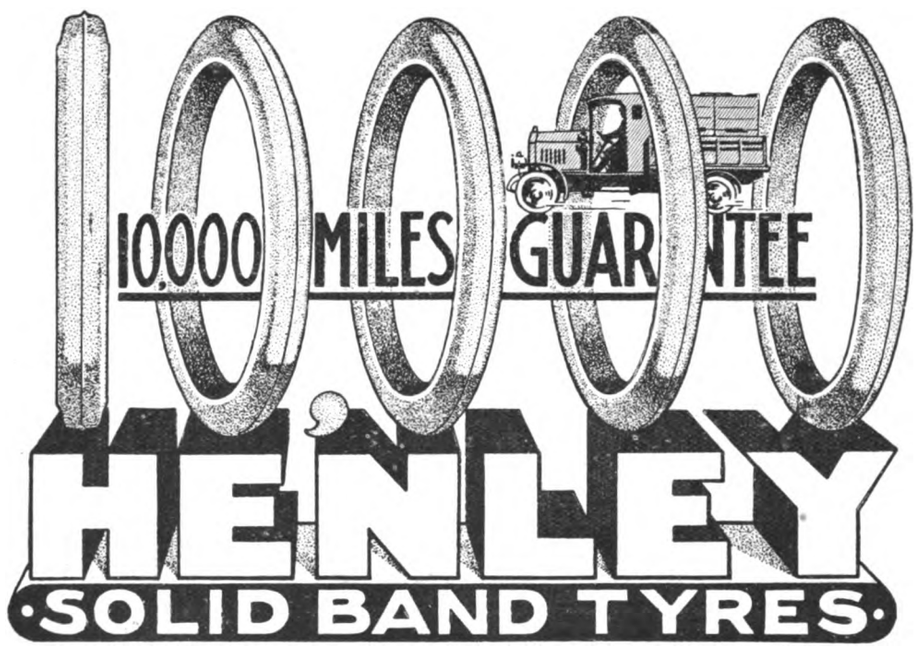
TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended January 1, the latest period for which full returns are available, give total receipts of £188,936, or £17,734 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £82 8s. 7d. per mile of single track, and last year at the rate of £75 11s., thus showing an increase for the week of £6 17s. 7d. per mile open. The principal London tramways have temporarily discontinued the publication of traffic returns.

BUSINESS NOTES.

Underground Calendar.—The publicity department of the allied transport undertakings of London have issued a florally-adorned calendar for 1916. It should prove an admirable reminder to Londoners of the facilities offered by the Underground, omnibus and tramways companies.

Karrier Cars.—A useful calendar sent out by Clayton & Co., Ltd., Huddersfield, has a representation in colours of a 50 h.p. 4-ton Karrier live axle chassis fitted with an ambulance body. Many of these vehicles are in use, adding to the comfort of our wounded men both abroad and in this country.



Manufacturers:

W. T. HENLEY'S TELEGRAPH WORKS CO., LTD.

Tyre Department:

18, NEW UNION STREET, MOORFIELDS, E.C.

Telephone No.: 3886 London Wall. Telegrams: "Hetewocol, Ave, London."

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. Jan. 14	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	63	63½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	79/4½	87½xd
4%	4%	Do. 4% Deb. ...	100	91	72	72½xd
4½%	4½%	Do. 4½% Deb. ...	100	98½	77½	77½xd
5%	5%	Do. 5% Deb. ...	100	96	80¾	80
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94¾	94¾xd
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅞	10 1/16	10 1/16
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½xd
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98	98xd
$½	$½	Brazilian Trac. & Power Ord....	$100	66	50½	51⅛
$1½	$1½	Do. 6% Cum. Pref.	$100	97	91½	91
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅜	6⅜
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	90¼	89¼xd
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	36
6%	5%	Do. Pref. Ord....	100	106	40	40
5%	5%	Do. 5% Cum. Pref.	100	103	60xd	60
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4¼%	4¼%	Do. 4¼% Perp. Con. Deb. ...	100	96½	64⅛	64⅛
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	77	75
70/-	70/-*	Do. 7% Pref.	100	55½	46	46½
—	—	Do. 6% Pref. Ord.	100	17½	15½	15½
—	—	Do. Def. Ord.	100	11	10	8¼
5%	5%	Do. 5% Deb.	100	92	82⅝	81½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87	87
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¼	5⅞	5⅞
1/3	1/3	City of B.A. Trams.	5	5½	91/10½	93/1½
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85½	85½xd
6/-	6/-	Dublin United Trys 6% Pref.	10	—	£11	£11
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	77½	77½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	3/8	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	9/15/6	9/15/6
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	86½	86½xd
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1⅜d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/4	2/4
6d.	6d.	Do. 5% Pref.	1	9/16	9/6	9/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	58¾	58¾xd
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	91½xd
5%	5%	Do. 5% Inc. Deb.	100	88½	84½	84½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51	51xd
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103⅜	105
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	69	69xd
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	73⅜	73⅜
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	82½	82½xd
$1¾	$1¾	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	47	48¾
6%	6%	Do. 6% Mt. Bds.	100	76	39¼	43½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	93½	93½
1/2*	1/2⅜*	National Steam Car	1	15/32	14/-	13/6
9⅜d.*	9⅜d.*	New General Traction	1	½	7/9	7/9
1/2⅜	6d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	67/6	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/-	10/-
8d.	10d.	Provincial Trams. Ord.	1	⅝	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	88	88⅜xd
5%	5%	1st. Mt. 5% 50 yr.	100	89½	77¾	78
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90	90
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	81
—	—	Singapore Elec. Trams	5/-	¼	2/9¾	2/9¾
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	—	94xd
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78	86
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	85/-	86/3

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	1915-16	Aggregate. Wks.	1915-16	Increase or Dec.
Anglo-Argentine	Jan. 7	£52,720	£50,841	1	£50,541	— £1,879
Auckland (28 days)	Dec. 17	20,414	21,804	24	125,840	+ 908
Ballarat and Bendigo ...	Nov. 7	3,835	3,586	32	25,097	— 2,670
Brazilian Traction Mlrs.	Nov.	5,929,730	6,336,000	48	70,586,110	+3,245,122
Brisbane	Dec.	30,890	33,960	52	372,034	+ 23,923
British Columbia $	Nov.	648,485	562,782	22	2,636,479	— 688,357
Buenos Aires Lacroze ...	Dec. 6	44,000	43,528	26	250,930	— 1,836
Burmah Tramway ... Rs.	Jan. 8	3,537	3,613	...	81,798	+ 6,826
Calcutta Rs.	,, 8	66,127	69,157	...	...	...
Cape Town	Nov.	...	13,870	...	...	...
Carthagena & Herrerias..	Dec.	1,255	2,129	52	21,968	— 3,354
Cordoba	Nov.	12,468	13,785	30	111,123	+ 3,784
East India	Dec.	1,839	2,062	22	10,516	+ 549
Hong Kong $	Dec. 11	9,821	10,744	50	549,355	— 8,354
Kalgoorlie	Oct.	2,525	2,675	44	27,791	+ 1,286
La Plata	Dec.	4,452	4,564	52	51,400	— 3,984
Lima	Nov.	29,712	30,703	48	351,169	— 9,612
Lisbon Escu.	Nov.	...	170,130	...	...	...
Madras (14 days) Rs.	Dec. 31	31,416	36,150	50	708,977	+ 42,356
Manila $	Nov.	129,000	129,447	48	1,353,983	— 116,711
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Sept.	...	61,211	...	...	...
Mexico $	*	...	...	...	...	...
Montevideo	Dec	28,605	31,305	8	59,712	+ 4,026
Port Elizabeth	Nov.	...	3,110	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Dec.	4,492	4,459	52	57,735	— 1,786
Shanghai $	Dec. 15	23,109	28,058	...	...	...
Singapore $	Dec. 11	10,538	12,341	...	569,215	+ 12,800
Toronto $	Nov.	824,634	851,113	48	8,793,719	— 502,658
Winnipeg	Nov.	330,398	323,025	48	3,122,620	— 610,281

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1914-15	1915-16	Incr. or Dec.	Aggregate. Wks.	1915-16	Incr. or Dec.
Aberdeen Corporation...	Jan. 5	£1,947	£2,152	+ £205	31	£56,797	+ £3,416
Accrington Corp.	Dec. 29	555	617	+ 62	39	21,750	+ 607
Ayr Corporation	Jan. 8	233	305	+ 72	34	13,363	+ 805
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 9	1,233	1,458	+ 225	40½	56,093	+ 4,677
Birmingham Corp.	,, 8	12,399	15,999	+ 3,600	41	582,490	+ 85,105
Blackburn Corp.	,, 5	1,219	1,199	— 20	40⅞	52,000	— 302
Blackpool & Fleetwood.	,, 8	290	380	+ 90	1½	459	+ 2
Blackpool Corp.	,, 6	734	957	+ 223	41	69,943	+ 1,961
Bolton Corporation	,, 9	2,568	3,050	+ 482	41	110,098	— 1,191
Bournemouth Corp.	,, 12	1,701	1,997	+ 296	41	87,750	+ 4,311
Bradford Corporation ...	,, 8	5,837	6,244	+ 407	40	263,484	+ 10,429
Brighton Corporation ...	,, 9	887	940	+ 53	41⅔	45,839	+ 541
Bristol	,, 7	8,832	9,515	+ 683	1	9,515	+ 683
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 8	1,519	1,699	+ 180	41	65,529	+ 1,875
Burton-on-Trent Corp...	,, 9	294	316	+ 22	41	11,694	— 328
Bury Corporation	,, 9	1,172	1,354	+ 182	40⅔	55,247	— 116
Cardiff Corporation	Dec. 25	2,676	2,768	+ 92	38	104,120	— 2,478
Chatham & District	Jan. 6	970	919	— 51	1	919	— 51
Chesterfield Corp.	,, 7	251	271	+ 20	40	10,925	+ 51
Colne Corporation	,, 8	220	246	+ 26	...	...	...
Cork Electric	,, 6	459	414	— 45	1	414	— 45
Croydon Corporation ...	Dec. 31	1,661	1,761	+ 100	39	72,620	+ 4,538
Derby Corporation	Jan. 8	961	1,098	+ 137	40⅞	42,848	+ 1,607
Dover Corporation	,, 1	260	298	+ 38	39	12,414	+ 2,181
Dublin & Lucan	,, 7	136	114	— 22	1	114	— 22
Dublin United	,, 7	5,821	6,171	+ 320	1	6,171	+ 320
Dundee City	,, 5	1,558	1,704	+ 146	33½	46,226	+ 2,573
East Ham Corporation	,, 8	1,298	1,349	+ 51	40⅔	52,978	+ 5,579
Exeter Corporation	,, 7	341	360	+ 19	40	15,331	+ 811
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	,, 8	21,095	24,252	+ 3,157	32	693,396	+ 49,998
Glasgow Subway	,, 8	1,115	1,290	+ 175	1½	1,480	+ 165
Glossop (U. Elec. Supp.)	,, 8	108	134	+ 26	2	278	+ 58
Halifax Corporation	,, 4	2,025	1,959	— 66	39½	39,211	+ 639
Hastings & District	,, 7	715	825	+ 110	1	825	+ 110
Huddersfield Corp.	,, 8	2,343	2,642	+ 299	40	108,525	+ 4,808
Hull Corporation	,, 8	3,120	3,322	+ 202	40	125,066	— 1,946
Ilford U.D.C.	,, 8	602	661	+ 59	40	26,351	+ 2,988
Ilkeston Corporation ...	,, 12	111	130	+ 19	41	5,529	+ 253
Ipswich Corporation	,, 8	391	501	+ 110	39	22,313	+ 3,628
Isle of Thanet	,, 8	268	268	nil	14	3,719	— 966
Kilmarnock Corp.	,, 8	167	199	+ 32	34	5,786	+ 196
Lanarkshire	,, 6	2,360	2,448	+ 88	1	2,448	+ 88
Lancashire United	,, 5	1,772	1,883	+ 61	1	1,267	+ 7
Leeds City	,, 8	8,038	9,119	+ 1,081	41	364,595	+ 28,216
Leicester Corporation ...	,, 8	2,911	3,279	+ 368	2	3,915	+ 650
Leith Corporation	,, 8	697	850	+ 153	34	26,318	+ 1,828
Leyton U.D.C.	,, 6	1,232	1,539	+ 87	40	65,117	+ 9,342
Liverpool Corporation...	,, 8	12,849	14,240	+ 1,391	1½	16,393	+ 1,175
Llandudno & Colwyn B.	,, 7	175	178	+ 3	5½	995	+ 33
London County Council	Sept. 22	41,976	46,960	+ 4,984	25	1,095,822	— 4,285
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	Jan. 8	159	137	— 22	13½	1,863	— 687
Maidstone Corporation..	,, 6	180	214	+ 34	40	8,879	+ 334
Manchester Corp.	,, 8	16,759	18,334	+ 1,575	40	725,070	+ 24,065
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	,, 8	160	191	+ 31	40½	7,941	+ 398
N'castle-on-Tyne Corp.	,, 8	5,720	5,930	+ 210	40	253,108	+ 27,565
Newport (Mon.) Corp....	,, 8	769	898	+ 129	41	34,300	+ 1,024
New St. Helens & Dist.	,, 5	883	992	+ 109	27	28,338	+ 2,863
Northampton Corp.	,, 7	582	716	+ 134	40⅞	29,433	+ 5,079
Nottingham Corp.	,, 6	3,371	3,713	+ 342	40	150,395	+ 11,186
Oldham Corporation ...	,, 9	1,930	2,343	+ 413	42	95,336	+ 4,267
Portsmouth Corp.	,, 1	2,155	2,285	+ 130	40	99,233	...
Preston Corporation	,, 5	817	1,052	+ 235	40	39,119	+ 1,886
Provincial	,, 8	1,909	2,167	+ 258	14½	29,548	+ 1,995
Reading Corporation	,, 6	736	750	+ 14	40½	32,084	+ 3,386
Rhondda Tramways	Dec. 31	1,611	1,623	+ 12	52	61,862	— 1,930
Rochdale Corporation...	Jan. 8	1,499	1,703	+ 204	39½	69,320	+ 3,244
Rotherham Corp.	,, 12	923	1,259	+ 336	41	48,435	+ 6,076
Salford Corporation	,, 10	4,640	5,241	+ 601	40⅞	212,315	+ 8,717
Sheffield Corporation.	,, 9	7,965	9,737	+ 1,772	41½	373,430	+ 50,815
Southampton Corp.	,, 5	1,285	1,527	+ 242	40	60,661	+ 6,825
Southend-on-Sea Corp...	Dec. 29	601	651	+ 56	39	32,629	— 7,958
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	Jan. 1	772	799	+ 27	39⅜	31,596	+ 1,278
Sunderland Corp.	,, 9	1,304	1,610	+ 306	41	61,646	+ 1,204
Sunderland District	,, 5	585	694	+ 109	10	5,682	+ 430
Swindon Corporation ...	,, 5	172	204	+ 32	40	7,989	+ 724
Torquay Tramways	Dec. 31	545	553	+ 8	52	28,025	— 389
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	,, 29	567	545	— 22	26	15,470	— 686
Wallasey Corporation ...	Jan. 8	1,113	1,230	+ 117	40⅔	52,196	+ 985
Walsall Corporation	,, 8	651	804	+ 153	2	961	+ 87
Walthamstow U.D.C.	,, 8	723	789	+ 66	41	36,558	+ 3,553
Warrington Corp.	Dec. 30	410	513	+ 103	39	18,097	+ 939
West Ham Corporation	Jan. 6	2,840	3,028	+ 188	40½	124,933	+ 10,710
Wigan Corporation	,, 6	1,387	1,693	+ 306	40	62,169	+ 3,135
Wolverhampton Corp.	,, 12	1,032	1,152	+ 120	41	46,365	+ 2,761
Yorkshire (W. Riding)...	,, 9	1,409	1,697	+ 288	2	3,496	+ 582

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 5.] LONDON, SATURDAY, JANUARY 22, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF HALIFAX.

STORES AND MATERIAL.

Tenders are invited for the supply of the following stores and materials required in the Tramways Department of the Halifax Corporation during the twelve months ending March 31, 1917, viz.:—

Schedule No.

1. Iron and steel.
2. Timber.
3. Bolts and nuts.
4. Ironmongery, including nuts, washers, nails, screws, etc.
5. Glass.
6. Lighting fittings.
7. Insulating materials.
8. Vulcanized rubber cable, copper and phosphor bronze wires and steel binding wires.
9. Anti-friction metal.
10. Oils and grease.
11. Paints and varnishes.
12. Painting and cleaning brushes.
13. Cleaning materials.
14. Castings (malleable iron and cast iron), including track brake and wheel brake blocks.
15. Trolley and overhead line materials.
16. General stores, including rubber window strip, rubber hose, felt pads, etc.

Samples may be seen at the Stores, Skircoat Road Depot any day Monday to Friday, January 24 to 28, and Monday to Friday, January 31 to February 4, 1916, between 9 a.m. and 4 p.m. Forms of Tender and full particulars may be obtained from the Tramways Engineer, Tramways Office, Skircoat Road, Halifax, between the above dates. Intending contractors must state the number of schedule required. Duplicate copies of each schedule may be obtained on application to the Tramways Engineer on payment of 6d. per copy.

Tenders in the envelopes provided must be sent to the undersigned on or before Monday, February 14, 1916.

Any sample submitted by the tenderers (which will not be paid for by the Corporation) must be marked "Sample—Tender for Tramway Stores," and sent to the Tramways Engineer's Office, Skircoat Road, Halifax.

The persons whose tenders are accepted will be required to observe the fair contracts clauses adopted by the Corporation.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
PERCY SAUNDERS,
Town Clerk.

Town Hall, Halifax,
January 8, 1916.

WEST HAM CORPORATION TRAMWAYS.

TRAMWAY RAILS.

Required 600 tons or any less quantity of No. 4 B.S.S. Tramway Rails. Reply giving quantity, date of delivery and price—free on rail, Plaistow Station—to General Manager, West Ham Corporation Tramways, Greengate Street, Plaistow, E.

COUNTY BOROUGH OF WIGAN.

TRAMWAYS DEPARTMENT.

MATERIALS AND STORES.

The Tramways Committee of the Wigan Corporation invite Tenders for the supply of the following materials and stores for the year ending March 31, 1917.

Paints, varnishes, etc., and brushes.
Iron and steel.
Tramcar accessories, steel tires, axles, etc.
Brass and iron castings, malleable iron castings and brake blocks.
Oil and grease.
Ironmongery.
Glass.
Overhead line material.

Specifications and forms of Tender may be obtained on application to Mr. Frank Buckley, General Manager, Corporation Tramways, Market Place, Wigan.

Tenders (endorsed with name of article tendered for) to be addressed to the Town Clerk, King Street West, Wigan, and must be received not later than Saturday, February 5, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Wigan,
January 19, 1916.

MANCHESTER CORPORATION TRAMWAYS.

MOTOR 'BUS ENGINES AND CHASSIS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply and delivery of Motor 'Bus Engines and Chassis. Conditions of contract and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Tender for Engines and Chassis," and must be received not later than 10 a.m. on Tuesday, February 8, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
January 20, 1916.

WALSALL CORPORATION TRAMWAYS.

UNIFORMS.

The Corporation of Walsall invite tenders for the supply of Tramway Uniforms for Inspectors, Drivers, Conductors, etc., for the year 1916.

Particulars and form of Tender may be obtained from the Tramway Manager's Office, St. Paul's Buildings, Walsall, where standard samples may be seen.

Tenders, endorsed "Tender for Uniforms," are to be sent to the Town Clerk, Council House, Walsall, on or before Monday, February 7. Samples of cloth are to be addressed to St. Paul's Buildings.

The Corporation do not bind themselves to accept the lowest or any tender, and they will not accept the tender of any firm paying to their workmen less than the standard rate of wages current in the district where the clothing is to be made.

R. L. HORSFIELD,
General Manager.

St. Paul's Buildings, Walsall.
January 19, 1916.

Digitized by Google

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

STORES.

The Directors are prepared to receive Tenders for the supply of the following stores, namely :—

Steel axles for wagons.
Straight axles for locomotives.
Helical springs.
Steel screw couplings, etc.
Steel rails and fishplates.
Steel fishbolts, etc.
Cranked fishplates.
Brass and iron screws.
Ramps.

Specifications and forms of Tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Steel Axles for Wagons," or as the case may be, not later than 11 o'clock a.m. on Thursday January 27, 1916.

The Directors do not bind themselves to accept the lowest or any Tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.
January 19, 1916.

CHINESE GOVERNMENT RAILWAYS.

(CANTON-HANKOW RAILWAY, HUPEI-HUNAN SECTION.)

LOCOMOTIVES.

Tenders are required for

Four 4-6-0 Passenger Locomotives,
Four 2-8-0 Freight Locomotives,
Two 0-6-0 Shunting Locomotives,

for the above railway.

Conditions of Tender, drawings, and specifications may be obtained from the consulting engineers, Messrs. C. P. Sandberg, Palace Chambers, 9, Bridge Street, Westminster, on payment of 10s.

Tenders to be delivered to Messrs. C. P. Sandberg before 12 noon on January 31, 1916.

BURGH OF AYR.

UNIFORMS.

Tenders are invited for the supply of Uniforms for Tramway Inspectors, Motormen, and Conductors.

Forms of tender and particulars may be obtained on application to Mr. W. Grant, A.M.I.E.E., Tramway Manager, Town Buildings, Ayr.

Sealed tenders, endorsed "Tramway Uniforms," with separate sample of cloth marked with a private mark which shall not be recognisable until the tenders are opened, must be delivered to the undersigned not later than Wednesday, February 2, 1916.

The lowest or any tender may not necessarily be accepted.

P. A. THOMSON,
Town Clerk.

Town Hall, Ayr.

COUNTY BOROUGH OF WALSALL.

ELECTRIC SUPPLY DEPARTMENT.

APPOINTMENT OF SHIFT ENGINEER.

Applications are invited for the position of Shift Engineer at the Walsall Corporation Electricity Works.

Applicants must have had a sound mechanical and electrical training and must have had previous experience of a similar kind in a large extra high-tension three-phase generating station.

The person engaged will be on war service, but no applications are desired from those so engaged at present, without the full consent of their employers.

Written applications, stating age and wages required and enclosing full particulars of previous experience, together with not more than three recent testimonials, should reach the undersigned not later than January 27.

H. A. HOWIE,
Engineer and Manager.

Electric Supply Department,
Wolverhampton Street, Walsall,
January 11, 1916.

POSITION WANTED.

GENERAL FOREMAN AND FOREMAN PLATELAYER.

General Foreman and Foreman Platelayer, thoroughly experienced in tramway construction and reconstruction and permanent-way repairs desires employment. First class testimonials.—Address, Box 15, "Tramway and Railway World," Amberley House Norfolk Street, London, W.C.

Wanted, copies of "THE TRAMWAY AND RAILWAY WORLD," of the following dates :—March, July, and September, 1909 ; January, 1910 ; August, September and December, 1911 ; April and October, 1912 ; and October, 1915.—Address, Box 97, "Tramway and Railway World."

Pole Paints

As supplied to important Companies at home & abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples & Prices on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers,
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160. WOODHOUSE LANE, LEEDS.

Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams : "Controllers, Leeds."
Telephone : 8488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

THE AUTOBUS

IN THE TRAMWAY WORLD.

Motor Traffic Section.

When "The Tramway and Railway World" was founded in 1892, motor traction was, of course, scarcely dreamt of, but the avowed object of the paper was to encourage all new methods that gave promise of usefulness.

In pursuance of that policy the progress of motor traction received early attention. Commenting on the historic motor parade to Brighton in 1896, "The Tramway and Railway World" predicted that

> "It would give a prodigious impulse to transport both by road and rail."

Within a decade this prophecy was abundantly fulfilled and so much space has been devoted to the new industry that in 1906 a special

MOTOR TRAFFIC SECTION

was added. Every illustrated issue thus contains a section devoted especially to motor cars for Public Service, and includes articles on current topics, illustrated descriptions of new types of vehicles and accessories, and the latest news.

Public Service Motor Cars.

The importance of this section will be gathered from the fact that an increasing number of the leading municipal authorities, railway and transport companies, now own and operate large fleets of motor vehicles of various types, including omnibuses, char-a-bancs, motor lorries for the transport of goods, parcel delivery vans, tower wagons, motor street sweepers, etc.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates :
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JANUARY 22, 1916.

PREVENTABLE ACCIDENTS.

The degree of efficiency of a passenger-carrying business is reflected in the number of accidents due to preventable causes. The greater the efficiency the fewer are the mishaps arising from circumstances that can be avoided. Under the trying conditions that have beset them during the past year, managers have evidently not neglected the important task of providing thorough instruction for the ever-changing personnel of the employees in the ways and means of preventing accidents. This year the managers' difficulties are likely to become greater. The extreme restrictions of street and car lighting have now been extended to the west coast, and managers and passengers in that district are consequently experiencing the annoyances that have for so long been endured elsewhere. Passengers on some lines are now grumbling because of the dull and dismal hue given to the car lights. The lighting restrictions must, of course, be complied with, but in a number of towns it has been found possible, by the use of suitably designed shades, to give considerable light within the car. Traction and lighting authorities in London are also making successful efforts within the limits allowed by the military authorities to diminish the number of accidents that occur at night. At busy points the light of the lofty incandescent gas lamps has hitherto been practically blackened out. A new device is to fix two lights at a height of about 20 feet up the standards with flat shades. By the management of the London County Council tramways another contribution is also being made to the safety of pedestrians at night. Intending passengers at badly-lighted stopping-places have had to incur risks from oncoming motor vehicles by going into the roadway in order to gain a close view of side destination boards or the faintly-illuminated route indicators. A new and efficient device now being carried into effect gives a red inset to the white crystals of the route numbers, thus rendering them more visible. On the subdued orange dash light the licensed number of the car is being shown in black figures. A good instance of determination to increase the efficiency and safety of transport services is afforded by the underground railways and the London General Omnibus Company. Their operating manager has recently arranged a series of efficiency meetings, at which various topics will be made the subject of papers and discussion. One paper will be headed, "Safety First Campaign: A Sound Proposition with an Unsound Title." Criticism of the title is not a matter of consequence, but there is no denying that the movement has been productive of much good in the United States, where both railways and street car companies have adopted it. In this country the Great Western Railway have taken up the question with so much vigour in their magazine during the past two years that a similar movement has been initiated in one of the Australian States. In Glasgow it was begun with zeal by the tramway department not long before the outbreak of war, and there can never be a more suitable time for London, or any other place, to follow the example. Another direction in which accidents can be prevented is indicated by the running away and overturning of a car at Dudley. This is not the first time in this country that a car on the brink of a descent, and with the motorman absent from the platform, has been started by the conductor releasing the hand-brake at the rear without making sure that the driver was at his post. In this case it is to be feared that the conductor's zeal to keep time was the first tributory cause of the mishap. There are several ways in which the possibility of such an accident could be averted, apart from the institution of a rule that the track brake shall be applied when a car is left unattended in a position in which there is the risk of it being set in motion; and it may be hoped that this will be the last accident arising from this cause.

ORGANISATION OF MESS-ROOMS.

A paper dealing with "Mess-Rooms and their Organisation" was read by Mr. S. G. Rodway, mess-room superintendent of the London General Omnibus Company, at the first of a series of efficiency meetings for the officials of the operating department of the underground Railways and London General Omnibus group. This commendable departure has been arranged by Mr. H. E. Blain, the operating manager, who presided, supported by the heads of the various departments.

In opening the proceedings, the chairman stated that the object was to enable both the outside and inside officials to discuss, from an efficiency standpoint, the methods adopted in the operation of the railways and omnibuses, with a view to improving them still further. For this purpose the frankest expression of opinion was invited.

Sir Albert Stanley, the managing director, paid a tribute to the manner in which the work had been carried on during the exceedingly trying conditions since the outbreak of war, and referred to the desire of the companies and the directors that every member of the staff should feel his suggestions would be valued and appreciated, there being the greatest possible desire for close connection between the employees and the companies.

Mr. Rodway's paper detailed the mess-room organisation of the London General Omnibus Co., Ltd. In all the newer garages there were large and comfortable rooms available as mess-rooms and institutes, where the catering was provided at the lowest possible price and where facilities for billiards, etc., were afforded. The first of these institutions was opened at Hendon in May, 1913, since which date sixteen others had been opened in various suburbs, while catering facilities were furnished at Victoria Station. The gross number of purchases per annum was about two millions, the average amount of each transaction being 2.44*d*. The food, etc., was sold at a cost which practically covered the wages of the mess-room working staff, but the account was not debited with any portion of the cost of construction, maintenance, or lighting of the institutes. By means of a chart Mr. Rodway showed the increased prices and fluctuations of the principal dry goods used. By careful selection and the introduction of devices for saving labour and material, such as automatic potato-peelers, patent boilers, floor scrubbers, etc., and by making all the pastry at home, it had not been found necessary to raise the mess-room tariff, except very slightly in connection with tea

Subsequent meetings will discuss the following topics:—A parcels system on the Underground railways; the graphic representation of operating returns; time-tables and duty sheets, comments and criticisms on methods and practice; railway and bus tickets, and other checking devices; a "safety first" campaign, a sound proposition with an unsound title; social welfare and co-operative developments; advertising, publicity, and decorative developments, etc.

Digitized by Google

FINANCES OF WALTHAMSTOW TRAMWAYS.

The financial position of the Walthamstow tramways undertaking has now reached a stage where some change more drastic than the shortening of the halfpenny fare stages is required if the undertaking is to be put on a sound footing. Yet this appears to have been all that the Council were prepared to do after a lengthy discussion during which the serious financial position of the undertaking was disclosed. Never a very promising venture, on account of the ill-advised character of the scheme, the Walthamstow Tramways at the outset suffered from the lack of capable and resolute management. From the very inception of the scheme there was a strong feeling among a section of the Council that the first duty of the tramways was to confer the utmost advantages upon the working classes, even at the expense of the general body of the ratepayers, and as that spirit has more or less influenced the policy of the Council during the ten years the tramways have been in operation, the present condition of the undertaking will not surprise anyone conversant about the early history of the enterprise.

As we have said, the scheme was a bad one. No competent advice appears to have been taken at its inception, and when, at a later date, constructive criticism, having reference to the lengths of single track in some parts and the unnecessary double track in other parts, was offered, this was resented, and the original scheme was carried out, with the result that before the cars had been running many months extensive track alterations added some thousands of pounds to the already heavy capital cost. Moreover, the competition by the motor omnibuses, which is largely responsible for the loss of revenue now complained of, has been materially assisted by the lack of foresight, not to use a stronger term, on the part of the promoters of the tramway scheme.

From the figures given in our issue of December 9, it will be seen that the capital sum borrowed for the undertaking was £194,000, of which £190,447 has actually been expended. Of this sum only £25,249 has been repaid, and £168,248 is still outstanding. A serious aspect of the position, however, is the fact that the ratepayers have been called upon to pay no less than £22,700 of the amount repaid during the ten years, while the deficit on the past year's working was £3,568. Bearing in mind the fact that there are no depreciation, renewal or reserve funds available, the words of Councillor Lyne at the recent meeting of the Council are very significant: "At the most in eight years, and more likely in five years, the Council will be faced with the responsibility of providing capital moneys to replace long sections of tramway track, and within the next twelve months capital sums for the purpose of replacing the overhead equipment. These capital sums will not be available by borrowing, for the simple reason that the present equipment, for which we borrowed money, has not been paid for, and therefore we shall be unable to borrow money for fresh equipment."

Without the fullest details it is impossible to form an opinion as to what is the right course—in the best interests of the ratepayers—for the Council to pursue, but it is perfectly clear that something more than the alteration of the halfpenny fare stages will be found necessary. It is probable that only by making the undertaking a subordinate part of an interrunning scheme of a bold and comprehensive character can the burden now borne by the ratepayers be removed. In these days no town council—least of all in a town where the rates are over ten shillings in the pound—has any justification for continuing indefinitely to impose a tramway rate.

EMPLOYEES AND INCREASED PAY.

According to Sir William Clegg, the chairman of Sheffield Corporation Tramways, the wages now paid to the tramways department are the highest in England. Sir William made that statement in introducing to the Council the Committee's recommendations for increased pay set out in our last issue; and he stated that the extra war allowance would amount to £7,012 per annum. It was proposed to institute a merit badge for the women conductors, which would entitle them to an extra shilling a week after one year's service. The Corporation adopted the recommendations.

Cardiff Tramways Committee have refused an application made by the employees' union for the wages of youths employed as conductors to be raised to those of the old employees. These conductors, as also the young women, have been taken on because of the scarcity of men. Mr. A. Ellis, the general manager, informed the Committee on January 14 that £4,060 had been spent during the past nine months in payment of wages to men who had joined the Army to raise their allowances to the wage standard before the war, according to the resolution of the City council. In addition £1,501 had been spent in the payment of war bonuses.

Further consideration is to be given by Darwen Tramways Committee to the employees' application for an advance of wages. The Committee have recommended that it should be refused, but the Corporation accepted an amendment on the ground that higher wages are received by the tramway employees of a neighbouring authority.

Pontypridd Council have referred to the Tramways Committee applications by the shed foremen and inspectors for higher wages, and for a halfpenny an hour to all the employees. The Council had previously granted the latter concession to men with over five years' service.

Mr. C. J. Spencer, general manager, has reported to Bradford Tramways Committee that the cost of complying with the employees' application for increased wages in lieu of bonus, would be £15,000 per annum. The Committee have referred the application to a special committee appointed by the Council to rectify anomalies arising out of the payment of bonuses.

CAR OVERTURNED AT DUDLEY.

Sixteen passengers were injured in an accident at Dudley on Sunday night to a car belonging to the South Staffordshire Tramways Company, six of the number being detained in hospital. An explanation of the occurrence is given in the following statements that were made by the motorman and conductor.

Joseph Fenn (47), the motorman, stated that he arrived at 5.20 at the Dudley terminus, Tipton Road, on a car from Wednesbury. When he stopped the car he put on the brake and left the vehicle in charge of the conductor while he went to meet a car on the Birmingham and Midland route for his tea, which was generally sent up by one of the cars on that line. He got his tea, and was returning when he saw the car going down the Tipton road at a fast speed. He ran after it, and saw it had overturned at the gates of the London and North-Western goods yard.

Timothy Parkes, the conductor, stated he was on the car due to leave Dudley at 5.20. After the passengers had left the car he reversed the trolley pole. About thirty passengers boarded the car, some inside and some on the top. Thinking the motorman was in the front of the car he rang the footbell, and released the back brake. The car started and he began to take the fares. When about a quarter of a mile down the road a woman inside said there was no one in front of the car. He was surprised to find there was no motorman. He then made for the rear of the car to put on the brake, but before he could get there the car left the line and ran into the railway crossing and overturned.

It is only necessary to add that Tipton Road has a slight gradient. The result was that the car attained a high speed. On reaching the turnout near the goods yard it ran across the road and turned over. A report of the accident states that the conductor, thinking the motorman had resumed his position in front, told the passengers to "Hurry up" when they were boarding the car.

SERVICE AND LIGHTING RESTRICTIONS.

In accordance with the Home Office Order for taking precautions against airship raids, the reduced lighting regulations for vehicles became applicable to a largely extended area on January 10. Liverpool is among the places affected.

The training of volunteer motormen at Birmingham has advanced sufficiently to allow of their services being utilised on the cars during the week-ends. Fifty professional and business men are thus engaged.

Although Salford Tramways Commitee have not yet had to consider the question of training women as drivers, it has become increasingly difficult to maintain the services. In consequence of further decreased lighting and the season of the year, extra time allowances have been granted on the various routes. Conductors have been instructed to pay great attention to announcing the stopping-places.

Burnley Council have authorised the tramways manager to ask the recruiting tribunal for the retention of the motormen attested for the army reserve.

Owing to recent enlistments, the tramway service on the Strood Hill route, Rochester, was suspended. As the result of a protest having been lodged with the Corporation by the citizens, the Chatham and District Light Railways Company have agreed to attempt to provide a reduced morning service.

Every service at Nottingham has been curtailed because of lack of men.

The time-tables of the London General Omnibus Company have been twice extended since the war began. An official of the company has stated that he could not advocate reducing the speed of night traffic to eight miles an hour, as there is no necessity for any driver to drive furiously, no penalty being imposed for delays. Safety of the road, added the official, is the consideration first urged upon all. Although over 2,000 of the most experienced drivers were on war service, the list of fatal accidents of the company was six less last year, the totals for the past two years being 120 and 126.

MOTOR OMNIBUS SERVICES.

Walsall Corporation have received delivery from the Daimler Company, Coventry, of three motor omnibuses that have been urgently required for meeting the demands of the traffic.

The utility of the motor omnibus was demonstrated in the suburban area of Aberdeen on January 13. During a gale a tree was uprooted and in its fall brought down a considerable length of overhead wire on the track of the Suburban Tramways Company. Mr. A. Wilkie, the manager, arranged an omnibus service during the two hours that the tramways were interrupted.

Owing to the shortage of labour the motor omnibus services in Wilmslow and Macclesfield districts have been curtailed, while penny stages have been abolished. On account of the latter occurrence, Wilmslow Council have decided not to grant further licences until penny stages are resumed.

Birmingham Tramways department, on January 17, reduced the speed of their omnibuses and shortened the Moseley end of the New Street and Moseley route owing to the stringent lighting regulations that came into force on January 10. The alterations have been made in order to ensure the vehicles running to time.

A marked preference in the charge made for motor spirit is being given by the petrol companies to the users of commercial vehicles.

Birmingham Tramways Committee on January 19 decided to purchase six additional omnibuses with Daimler chassis and Allen bodies, with garden seats in the fore part of the saloon. The department are already running forty-one omnibuses, having taken over the local omnibus company two years ago.

Digitized by Google

BRIGHTON LICENSING ACTION.

CORPORATION'S RESTRICTION AGAINST OMNIBUS COMPETITON UPHELD.

In the King's Bench Division on Thursday last, the Lord Chief Justice, Mr. Justice Sankey, and Mr. Justice Low resumed the hearing of the action—The King v. Brighton Corporation. A rule nisi for a mandamus had been obtained on behalf of Messrs. Thomas Tilling, Limited, directing the Town Council of Brighton to show cause why they should not hear and determine, according to law, an application by Messrs. Tilling for licences for hackney carriages and omnibuses, on the ground that the Corporation had not properly exercised the discretion which it had under the Towns Police Clauses Act, 1847.

The facts, as reported by "The Times," were given in our last issue, dated January 15.

In giving judgment, the Lord Chief Justice stated, according to "The Times" report, that it was contended that the application by Tilling's for omnibus licences had been refused in accordance with a predetermined rule of the Council that no competition should be allowed with the local company, and that there had not been an exercise of the Council's discretion according to law. The only question for the Court was whether there was evidence to show that in refusing the licences for omnibuses the Council had acted from bias or in an improper exercise of their discretion. It appeared that the Council had taken the advice of their Chief Constable upon the traffic conditions, and had been guided by his opinion, and the Court could not possibly say that they had been actuated by improper or immaterial considerations. As regards the omnibus licences, therefore, the rule must be discharged.

The case of the chars-a-bancs, the Lord Chief Justice added, was somewhat different. The Watch Committee had recommended that licences should be granted to Tilling's for chars-a-bancs, and the Council had refused Tilling's application and had granted licences for extra chars-a-bancs to the local company. They had given no reason for their refusal, and in the circumstances he felt that Tilling's had made out a prima facie case, and it was for the Council to show that they had exercised their discretion in a judicial manner. Further affidavits had now been put in, and it did appear that in refusing the chars-a-bancs licences the Council were showing their annoyance that Tilling's persisted in sending their omnibuses from Hove into Brighton though licences for Brighton had been refused to them.

The principle on which the Court acted in such a case was laid down in Sharp v. Wakefield ([1891] A.C., 179; 7 "The Times" Law Reports, 389) and Reg. v. Bowman ([1898] 1 Q.B., 663; 14 "The Times" Law Reports, 303), and R. v. London County Council 2 K.B., at 475).

The Court should be very slow to interfere with the decision of local authorities. It was the policy of Parliament to leave the decision of certain matters to those authorities, and the Court had always taken the view that it could not interfere with a decision reached by a local authority that had dealt with a case on its merits without considering matters which were inadmissible, even though on the facts the Court itself would have come to a different determination. But it was the duty of the Court to interfere when it came to the conclusion that the local authority had not properly exercised its discretion and had been influenced by extraneous matters. It was purely a question of fact on the evidence. Here it seemed that on the evidence the Council acted on extra-judicial considerations. He was sure that the Council had not intended to do anything which was not according to law, but it had strayed from the path marked out by law. So far as regarded the chars-a-bancs the rule must be made absolute.

Mr. Justice Sankey delivered judgment in which he agreed on both points.

Mr. Justice Low said that he agreed as to the omnibus licences, but he felt some doubt as to the chars-a-bancs licences. He was not, however, prepared to dissent from the other members of the Court.

The rule was, therefore, discharged as to the omnibuses and was made absolute as to the chars-a-bancs, with no order as to costs.

EMPLOYMENT OF WOMEN.

Seven hundred women are now engaged as conductors on the Birmingham cars, and a large number as cleaners. The Tramways Committee reported on January 15 that their work gives satisfaction.

At Reading there are twenty-two conductors, two inspectors and two clerks of the female sex. The conductors are being paid at the same rate as men, while the inspectors receive 30s. a week and the clerks 25s.

Women employed on the cars at Gloucester receive the same rate of pay as men. Their employment will be discontinued as soon as men are again available.

The maximum wages of the female staff in the tramways offices, Bradford, have been increased from 20s. to 30s. per week, owing to the exceptional conditions prevailing.

Nelson Tramways Committee have made the first appointment of a female conductor.

An allegation has been made in a Midland town that some of the female conductors use protruding hat-pins.

The Mayor of Gateshead attended the annual tea of the Tramways Company's employees, and congratulated the women conductors upon having filled the places of enlisted men. He also praised the civility of the employees generally. Mr. W. Morrison, general manager, observed that the work had been carried out successfully and harmoniously, and without serious accident.

The number of women conductors on the Salford cars is 190, and every week an addition is made. There are also several girls employed in the work of reversing the trolley arms. Female inspectors look after the comfort of the women employees at the well-organised central depôt, and Mr. G. W. Holford, the general manager, has stated that their health and comfort is the chief consideration of the Tramways Committee.

Many members of the Women's Relief Corps were among the women who applied for appointments as conductors at Bolton. The first sixteen appointed appeared on the cars for instruction on January 18 in their ordinary costumes. A sub-committee of the Tramways Committee visited Salford, Manchester, Ashton-under-Lyne, and Oldham to inspect the uniforms worn by conductors in those places, and they decided to select one that was devised by the general manager at Oldham, and which is illustrated in our issue dated January 13.

MISCELLANEOUS NEWS AND NOTES.

Repaving at Dublin.—A very large outlay for repaving the tramway tracks is under consideration by the directors of Dublin United Tramways Company.

Jarrow Tramways.—The Town Council have directed the borough surveyor to report upon the condition of the lines of the Jarrow and District Electric Traction Company within the borough.

New Zealand Tramway Extensions.—The ratepayers of Gisborne have authorised the Municipal Council to carry out tramway extensions at a cost of £30,000, and extensions of the electric light and power station at an estimated cost of £10,000.

A Record at Dundee.—Although the service has been curtailed, the last cars being at 10.30 p.m., the receipts on Dundee Corporation Tramways for the New Year week were £200 above the previous record.

Battery Vehicles at Sheffield.—The Health Department of Sheffield Corporation have accepted the offer of the electric supply department to provide, at a cost of £185, switchboards and fittings for charging electric vehicles.

Electric Vehicles on Hire.—Besides deciding to purchase a battery vehicle for the use of the electricity department, South Shields Council have applied to the Treasury for sanction to borrow £1,850 for carrying into effect a scheme for hiring out electric vehicles.

Motor Car Tuition for Women.—Mrs. Haywood, of 24a, Regent Street, S.W., is giving free instruction in motor driving and running repairs to ladies who have suffered through the war and are forced to earn their own living. Mrs. Haywood also finds positions for such pupils with leading London firms.

Pooling of Railway Stock.—The Home Office Committee which have been considering the advisability of drafting a scheme for pooling railway rolling stock with the object of facilitating transport, has passed on a recommendation to the railway managers' sub-committee asking them to co-operate in the scheme, which would be for the duration of the war.

Sheffield Car Collections.—Advertising in connection with the war collections on the Sheffield cars is not allowed to flag. Sir William Clegg, chairman of the Tramways Committee, informed the Corporation on January 12 that the forthcoming collection would be for Poland, and he expressed the hope that it would be liberally supported.

A Loan for Track Reconstruction.—Bournemouth Council have received the consent of the Board of Trade to borrow a sum not exceeding £6,000 for reconstruction of the Poole section of the tramways. The Treasury have stated that their consent was not required to the raising of the loan, unless the money was to be raised by the issue of stock, bonds, or bills, which is not the case.

Reckless Driving of Naval Motor Vehicles.—An Order in Council has been issued, directing that if any person in the Naval Service below the rank of subordinate officer drives a motor or other mechanically propelled vehicle so recklessly, negligently, or improperly as to bring discredit on the Service, his total daily pay may be reduced by one-sixth for a period not exceeding three calendar months.

A Manchester Mishap.—At an inquest held at Manchester on the body of a man who was injured through falling off a car staircase on to the street below while the car was in motion, Mr. G. R. Blackburn, rolling stock superintendent, said that if the accident had not occurred he would not have thought it possible. Although the car was not of the most modern type, it was similar in design to thousands that were in use in all parts of the country.

Boots for Women Conductors.—Gateshead women conductors are said to be wearing unsuitable boots, the heels being too high and the soles too thin. Mr. P. N. Gray, of the Electrical Federation Office, London, which supplies uniform and equipment to the associated tramways companies, has suggested to Mr. W. Morrison, the manager at Gateshead, that a boot club should be started by a committee of the conductors, who, with the manager, could arrange with a boot firm for the supply of suitable boots.

Glasgow Tramwaymen Facing the Enemy.—A number of casualties have occurred in the 15th Battalion Highland Light Infantry, composed of Glasgow Tramway employees, who are now in France. The fund collected on the cars to provide comforts has reached a total of £500. Some of the money has been expended in purchasing wool, out of which socks, mittens, etc., have been knitted by the wives and friends of the men and by female members of the tramways staff.

Metropolitan Association of Electric Tramways Managers.—A meeting of the members was held on January 14, at the Municipal and County Club, Whitehall Court, Whitehall, S.W., when the following were present:—Messrs. Ullmann (East Ham), chairman;

Digitized by Google

Schofield (Leyton), vice-chairman; Moffet (West Ham); Harvey (Ilford); Mackinnon (London United); and Goodyer (Croydon), hon. secretary. Letters of inability to attend were received from Messrs. Fell (L.C.C.), Bruce (L.C.C.), Murray (Walthamstow), Stokes (Bexley), Hammond (Metropolitan Electric), Williams (Erith), and Mason (South Metropolitan). Various matters of interest were discussed.

Span Wires in Place of Brackets.—Gateshead Council have agreed to the Tramways Company substituting span wires suspended from poles on each side of the Durham Road from Shipcote to the Low Fell terminus in place of the existing brackets. The application was granted on condition that the whole of the centre poles on the several tramway routes within Gateshead be removed by, and at the cost of, the company within two years.

Track Maintenance at Newport.—Mr. H. A. Tomlinson, principal foreman of renewals, having enlisted, Newport Council have appointed the sub-foreman to temporarily fill the position. Councillor J. Moxon, chairman of the Tramways Committee, in advocating that course, said it was difficult to secure the requisite working gangs, and the undertaking was suffering from defects inherent to the institution of the tramways. Large sections of the work were badly laid originally. Alderman Blackburn also observed that the foundations were bad. Until the foundation was thoroughly well laid the results would be unsatisfactory.

A Lead for Makers of Tramway Material.—Among the recommendations made by the Council of the London Chamber of Commerce on the subject of trade during and after the war are the following:—

(*a*) Preferential reciprocal trading relations between all parts of the British Empire; (*b*) reciprocal trading relations between the British Empire and the Allied countries; (*c*) favourable treatment of neutral countries; and (*d*) regulating, by tariffs and otherwise, trade relations with all enemy countries, so as to render impossible a return to pre-war conditions and for stimulating home manufactures.

That steps be taken to prevent dumping of enemy goods into British markets after the war.

Discriminatory taxes on the tonnage of all enemy ships using British ports.

State encouragement of the production and use of raw materials and manufactured goods within the Empire under such legislative conditions as will prevent their being controlled by, or on behalf of, subjects of enemy countries.

Motormen and Exemption from Military Service.—Sir Wm. Clegg, chairman of Sheffield Tramways Committee, informed the Corporation on January 12, that the question of tramway employment being regarded as a "reserved occupation," they had persuaded the Board of Trade to exempt the skilled men in their service from being called to the colours. They were endeavouring to get the same treatment for the drivers. So far, they had not succeeded, but it seemed to him a necessary corollary to what they had already obtained, for, without the drivers, the work of the skilled men would be useless. The Town Clerk reported that at the request of the Tramways Committee he had asked the local Members of Parliament to support the inclusion of tramway undertakings in the Munitions of War Amendment Bill, and that in the House of Commons on a subsequent date the Minister of Munitions had moved an amendment which was agreed to, which would bring certain tramway employees within the scope of the Bill.

A Grant from Sheffield Tramways Increased Profits.—Under the special powers given in the Sheffield Corporation Tramways Act the Tramways Committee recommended that a grant of £5,000 should be made to Sheffield University in view of its valuable war service. When the proposal came before the City Council it was opposed by Councillor Neal, who said that last year there was brought in to the credit of the rates from the tramways £34,497. This year the Committee had given the Finance Committee notice that they must expect a reduction of about £11,000 on that sum, subject to further problematical increases in wages and to the sum which they would be charged for excess profits. Sir Wm. Clegg in reply, said the main point was whether they could make the grant out of their increased profits. After taking into account all the increased expenditure, including increases in wages, the net increased profit for the half-year ended September 29 last was £11,885, and by the end of the financial year ending March 25, they would have an increased net profit over the previous year of nearly £20,000. The cars were carrying over 2,600,000 passengers per week, and there was no likelihood of any decrease in the takings from now to March 25. The recommendation was agreed to.

Conveyance of Soldiers and Nurses.—Owing to the overcrowding of cars by soldiers, the general public have often been obliged to walk at Stockport. The Council have consequently withdrawn the privilege of free rides, except for wounded soldiers, and the Tramways Committee hope to grant some concession to men who are billeted at some distance from their training centre. 35,875 free tickets were issued to soldiers and sailors on the cars at Wallasey in November. Civilian passengers numbered 970,591. In November, 1914, the figures were 52,904 and 920,020. Red Cross and St. John Ambulance nurses are allowed to travel at half fare at Exeter when in uniform. On account of the shortage of cars and labour, Bournemouth Council have withdrawn, from January 11, the privilege granted to members of H.M. Forces to travel at workmen's fares at all hours when in uniform. In view of the cars in service not being sufficient for the traffic, and other difficulties, Cardiff Tramways Committee have agreed that they cannot grant free rides to wounded soldiers. Although Southport Tramways Committee advised that not more than four invalid soldiers should be conveyed free at one time on any one car, the Corporation have increased the limit to eight. Alderman Griffiths, chairman of the Committee, said they wished to do all they could for the soldiers but their first duty was to the public.

PERSONAL.

Mr. A. M. Duckham, of the Munitions Inventions department, has been appointed deputy director-general of munitions supply.

Regimental Sergeant-Major J. Gill, 23rd Battalion Rifle Brigade, prior to the war was on the traffic staff of Blackpool Corporation Tramways. On attaining his present rank he has been made the recipient of a sword from the non-coms. of the battalion.

Mr. F. W. Mozley, who has joined the engineering company of the Artists' Rifles O.T.C., is chief engineering assistant to Nelson Corporation, and not to Burnley Corporation, as stated last week. Mr. Mozley is the eldest son of the general manager of Burnley Corporation Tramways.

Mr. G. N. G. Tucker, of the "Electrician" Printing and Publishing Company, died on January 15 in his 64th year, after an illness extending over several months.

CONTRACTS AND ORDERS.

British Electric Transformer Company have received a contract for the supply of transformers to Liverpool Corporation.

Bournemouth Tramways Committee have accepted the tender of Walter Macfarlane & Co., at £122 10s., for erecting a shelter at the Poole terminus.

Nelson Council have accepted the tender of Messrs. Briggs, Jones and Gibson, of Manchester, for five uniforms for women car conductors.

Southampton Council have placed a contract with Messrs. Driver and Co., for the supply of 60,000 deal blocks for the Tramways department.

Sunderland Council have allotted contracts as subjoined:—Ferranti, Ltd., meters: Underfeed Stoker Company, Ltd., two Underfeed stokers.

W. T. Henley's Telegraph Works Company have received a contract to supply triple concentric cable and joint boxes to Ilford Council, at £2,319.

Birmingham Tramways Committee have placed an order for six motor omnibuses with Daimler, Chassis & Allen, bodies at a cost of about £1,000 each. The department hopes to receive delivery in about a month, the vehicles being required for the conveyance of munition workers.

Barnsley Council have accepted the following tenders for extensions to the generating station:—Willans & Robinson, Ltd., turbine, £2,590; Dick, Kerr, & Co., Ltd., alternator, £1,980; Willans and Robinson, Ltd., condenser, £2,150; British Insulated and Helsby Cables, Ltd., high-tension and low-tension feeders, £2,241.

Yorkshire Commercial Motor Company are supplying to Stockport Electricity Committee a five-six ton steam wagon, fitted with mechanically-operated end-tipping body 12 ft. by 6 ft. 6 in. by 3 ft. deep, with rubber tires and three-speed gear, at £695. Delivery is to be made during April next.

British Thomson-Houston Company have received an order from Bradford Electricity Committee for a spare rotor for the 3,000 kw. turbo-generators at the electricity works, for an induction motor installation from Chesterfield Council, subject to a load being sanctioned, and for a motor starter for a 2-ton electric capstan from Bristol Corporation Docks Committee.

Dennis Brothers, Ltd., of Onslow Works, Guildford, have received an order from the Blackpool Tradesmen's Association for an ambulance exactly similar in all details to the special type of ambulance built by Messrs. Dennis for the London County Council. Repeat orders for motor vehicles have been received from Messrs. Lever Brothers and the British Petroleum Company, and standard subsidy lorries have been supplied to Messrs. C. and G. Yeoman, of Canterbury, the Hants and Wilts Laundry Company, Nottingham Corporation Tramways, Messrs. Henry Ashwell, of Nottingham, etc.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

Now Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

MEMBER INSTITUTION OF MECHANICAL ENGINEERS; MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND; MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS; MEMBER MUNICIPAL TRAMWAYS ASSOCIATION; FELLOW PERMANENT WAY INSTITUTION.

FURTHER PRESS OPINIONS:

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON W.C.

FINANCIAL REPORTS AND MEETINGS.

Electrical Utilities Corporation.—A quarterly dividend of 1¼ per cent. on the preferred stock is announced.

Rio de Janeiro Tramways.—The directors of the Rio de Janeiro Tramway, Light and Power Company have declared a dividend of 1¼ per cent. on the capital stock.

Yorkshire (West Riding) Electric Tramways Company.—The number of miles run last year was 1,763,702, as against 1,778,509 in the preceding year. By a typographical error in our last issue the figure for 1915 was incorrectly given.

Wagon Finance Corporation.—The report of the Wagon Finance Corporation, Ltd., shows a profit of £15,728. The directors, recommend a further dividend of 5 per cent., making 10 per cent. for the year, placing £3,000 to reserve, making it £17,000, providing £1,100 for estimated excess war profits, and carrying forward £1,628. The directors add that the difficulty and delay in obtaining delivery of new wagons has caused a good deal of capital to be temporarily unproductive from time to time.

Effect of East London Railway Electrification.—The report of the East London Railway Company for the year ended December 31, 1915, shows a marked increase in passenger traffic since the lines were electrified in June, 1913. The number of passengers in 1913 was 5,149,064, in 1914 6,172,121, and in 1915 8,497,284. Owing to the railway now being under Government control the receipts and working expenses cannot be given. At the previously ascertained average rate of 1.27*d.* per each passenger, the passenger traffic should now yield about £45,000 per annum. Owing to largely increased bookings to and from the two New Cross stations, which afford relatively full mileage, the rate is, however, probably higher. The passenger lifts at Wapping were brought into use on October 4, thus rendering unnecessary the ascent or descent of 100 steps and largely increasing the bookings. The lines operating by electric traction include 3 miles 58 chains of double line and 25 chains of single line.

Yorkshire (West Riding) Electric Tramways Co., Ltd.

The eleventh ordinary general meeting of this company was held yesterday (Friday) at the offices of Messrs. Leon Bros., 31, Throgmorton Street, E.C. Sir Herbert S. Leon, Bart. (Chairman), presided, supported by the directors, Mr. Geo. E. Leon, Mr. B. Newgass, and Mr. E. Remnant, and there was a larger attendance of shareholders than usual. The Secretary (Mr. H. England) having read the notice convening the meeting and the auditors' certificate, the chairman moved the adoption of the report and accounts. He pointed to the growing character of the company's business, the passengers carried during the year being 11,602,483, and mileage 1,763,702, as against 10,716,858 and 1,778,509 respectively. The revenue amounted to £81,086 10*s.* 9*d.*, against £74,110 2*s.* 6*d.* for 1914, but the working expenses had increased by £3,474. The figures in the report showed the progressive way of the business, the increase being satisfactory and, so far as they could tell, being in no way due to the war conditions. There was not the slightest doubt that the company was now reaping the fruits of the foresighted policy adopted in years gone by. They had always looked ahead and done their best to encourage traffic. He referred to the difficulties encountered in carrying on their services owing to the loss of so many experienced men, a matter which showed itself in the compensation account, and expressed regret that at the outbreak of the war the Government had not devised some scheme for protecting and maintaining the public utility services so necessary for war workers. The labour difficulty had now become acute, and the staff changes in a month numbered 267 against a normal 30 among some 300 employees. In concluding, the chairman pointed out once more that in such a business as theirs there could be no finality in capital expenditure, and he warned the shareholders that sooner or later, when normal conditions were restored, they would be faced with the necessity of spending considerable sums of money. Mr. G. E. Leon seconded, and a discussion followed, in which Dr. Woody, Messrs. Taylor, Davenport, C. Lock, Green, and others took part. Considerable praise was accorded the Board on the successful working of the undertaking and the devotion of Mr. Harry England and his staff, the only criticism being the suggestion as to dealing with past arrears and interest on preference shares. The Chairman promised the matter should have the continued consideration of the Board, whose policy was to do nothing at the present moment to impair the admitted financial soundness of the undertaking. Sir H. S. Leon, Bart., and Mr. B. Newgass were re-elected to the directorate and the auditors, Messrs. W. S. Blackburn & Co., were unanimously re-appointed. Votes of thanks to the chairman, staff, and employees of the company closed the meeting.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended January 8, the latest period for which full returns are available, give total receipts of £186,311, or £21,291 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £81 5*s.* 9*d.* per mile of single track, and last year at the rate of £72 16*s.* 5*d.*, thus showing an increase for the week of £8 9*s.* 4*d.* per mile open. The principal London tramways have temporarily discontinued the publication of traffic returns.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Jan. 20	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	63½	63
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	81/3	79/4½
4%	4%	Do. 4% Deb. ...	100	91	70¾	72
4½%	4½%	Do. 4½% Deb. ...	100	98½	77¼	77½
5%	5%	Do. 5% Deb. ...	100	96	80¼	80¾
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	19/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94¾	94¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10 1/16	10 1/16
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98	98
$½	$½	Brazilian Trac. & Power Ord....	$100	66	52½	50½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	91¼	91½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 13/32	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	90¾	90¼
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	40	40
5%	5%	Do. 5% Cum. Pref.	100	103	58xd	60xd
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85¼	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	65	64⅝
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	76½	77
70/-	70/-*	Do. 7% Pref.	100	55½	46	46
—	—	Do. 6% Pref. Ord.	100	17½	15½	15½
—	—	Do. Def. Ord.	100	11	10	10
5%	5%	Do. 5% Deb.	100	92	82¾	82⅝
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87	87
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¼	6 1/16	5⅞
1/3	1/3	City of B.A. Trams.	5	5½	92/6	91/10½
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	83½	85½
6/-	6/-	Dublin United Trys. 6% Pref.	10	—	£11	£11
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	77½	77½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¾	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	9/15/6	9/15/6
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	86½	86½
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1¼d.	Lond. & Sub. Traction Ord. ...	1	15/16	1/9	2/4
6d.	6d.	Do. 5% Pref.	1	9/16	8/9	9/6
4½%	4½%	Do. 4½% 1 Mt. Deb.	100	75½	58½	58¾
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	84	84½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	69	69
5½	5½	Manila Elec. R. R. & Light ...	$100	102	73⅝	73⅝
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	82½	82½
$1¾	$1¾	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	46	47
6%	6%	Do. 6% Mt. Bds.	100	76	39¼	39¼
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½	93½
1/2*	1/2¾*	National Steam Car	1	15/32	13/6xd	14/-
9⅜d.*	9⅜d.*	New General Traction	1	½	7/9	7/9
1/2¾	6d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	67/6	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/-	10/-
8d.	10d.	Provincial Trams. Ord.	1	27/32	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	87¾	88
5%	5%	1st. Mt. 5% 50 yr.	100	89½	77	77¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	87½	90
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	¼	2/9¾	2/9¾
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	—	—
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%[f]	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%[f]	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78	78
—[g]	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-[h]	3/-	Do. 6% Cum. Pref.	5	4⅜	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Increase or Dec.
Anglo-Argentine	Jan. 14	£51,491	£50,239	2	£101,080	— £3,131
Auckland.....(28 days)	Dec. 17	20,414	1,804	24	125,840	+ 908
Ballarat and Bendigo ...	Nov. 7	3,835	3,586	32	25,097	— 2,670
Brazilian Traction Mlrs.	Nov.	5,929,730	6,336,000	48	70,586,110	+3,245,122
Brisbane	Dec.	30,890	33,960	52	372,034	+ 23,923
British Columbia.....$	Nov.	648,485	562,782	22	2,636,479	— 688,357
Buenos Aires Lacroze ...	Dec. 6	44,000	43,528	26	250,930	— 1,836
Burmah Tramway ... Rs.	Jan. 15	3,435	3,743	...	85,541	+ 7,134
Calcutta.....Rs.	„ 15	67,513	70,455	2	150,956	+ 8,126
Cape Town	Dec.	...	16,589	...	...	...
Carthagena & Herrerias..	Dec.	1,255	2,129	52	21,968	— 3,354
Cordoba	Nov.	12,468	13,785	30	111,123	+ 3,784
East India	Dec.	1,839	2,062	22	10,516	+ 549
Hong Kong .....$	Dec. 18	9,813	10,796	51	560,151	— 7,371
Kalgoorlie	Oct.	2,525	2,675	44	27,791	+ 1,286
La Plata	Dec.	4,452	4,564	52	51,400	— 3,984
Lima	Nov.	29,712	30,703	48	351,169	— 9,612
Lisbon .....Escu.	Nov.	...	170,130	...	...	...
Madras (14 days).....Rs.	Jan. 15	28,435	34,257	52	743,234	+ 48,178
Manila .....$	Nov.	129,000	129,447	48	1,253,983	— 116,711
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Sept.	...	61,211	...	...	...
Mexico .....$	*	...	...	...	...	...
Montevideo	Dec	28,605	31,305	8	59,712	+ 4,026
Port Elizabeth	Dec.	...	4,360	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Dec.	4,492	4,459	52	57,735	— 1,786
Shanghai .....$	Dec. 15	23,109	28,058	...	...	...
Singapore .....$	Dec. 11	10,538	12,341	...	569,215	+ 12,800
Toronto.....$	Nov.	824,634	851,113	48	8,793,719	— 502,658
Winnipeg	Nov.	330,398	323,025	48	3,122,620	— 610,281

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1914-15	Latest Return. 1915-16	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Incr. or Dec.
Aberdeen Corporation...	Jan. 12	£1,560	£1,804	+ £244	32	£58,601	+ £3,660
Accrington Corp.....	Dec. 29	555	617	+ 62	39	21,750	+ 607
Ayr Corporation	Jan. 13	215	244	+ 29	35	13,607	+ 835
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 16	1,218	1,408	+ 190	41½	57,501	+ 4,867
Birmingham Corp.	„ 15	12,189	15,564	+ 3,375	42	598,055	+ 88,480
Blackburn Corp.	„ 12	981	1,116	+ 135	41⅔	53,117	— 190
Blackpool & Fleetwood.	„ 15	259	312	+ 53	2	771	+ 55
Blackpool Corp.	„ 13	611	785	+ 174	42	70,728	+ 2,136
Bolton Corporation.....	„ 16	2,482	2,600	+ 118	42	112,699	+ 1,073
Bournemouth Corp.....	„ 19	1,708	1,880	+ 172	42	89,630	+ 4,482
Bradford Corporation ...	„ 15	6,021	6,184	+ 163	41	269,668	+ 10,592
Brighton Corporation ...	„ 16	842	874	+ 32	41⅚	46,714	+ 573
Bristol	„ 14	8,382	9,589	+ 1,207	2	19,104	+ 432
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 15	1,419	1,689	+ 270	42	67,218	+ 2,145
Burton-on-Trent Corp...	„ 16	281	282	+ 1	42	11,976	— 329
Bury Corporation.....	„ 16	1,170	1,274	+ 104	41⅚	56,520	— 12
Cardiff Corporation.....	„ 8	2,533	2,806	+ 273	40	109,836	— 2,018
Chatham & District.....	„ 13	969	1,038	+ 69	2	1,958	+ 18
Chesterfield Corp.	„ 13	248	261	+ 13	41	11,187	+ 64
Colne Corporation	„ 8	220	246	+ 26	...	...	...
Cork Electric	„ 13	427	470	+ 43	2	884	— 2
Croydon Corporation ...	„ 7	1,670	1,778	+ 108	40	74,399	+ 4,646
Derby Corporation	„ 15	914	1,021	+ 107	41⅔	43,870	+ 1,715
Dover Corporation	„ 15	247	263	+ 16	41	12,944	+ 2,214
Dublin & Lucan	„ 14	109	113	— 4	2	228	— 17
Dublin United	„ 14	5,695	6,041	+ 346	2	12,212	+ 698
Dundee City	„ 12	1,207	1,293	+ 86	34¼	47,519	+ 2,648
East Ham Corporation	„ 15	1,245	1,303	+ 58	41⅔	54,281	+ 5,636
Exeter Corporation.....	„ 14	317	335	+ 18	41	15,666	+ 829
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	„ 15	19,688	21,755	+ 2,067	33	715,151	+ 52,190
Glasgow Subway.....	„ 15	1,066	1,211	+ 145	2	2,691	+ 310
Glossop (U. Elec. Supp.)	„ 15	109	131	+ 22	3	410	+ 80
Halifax Corporation.....	„ 11	1,925	2,066	+ 141	40⅔	91,306	+ 780
Hastings & District.....	„ 14	778	773	— 5	2	1,598	+ 105
Huddersfield Corp.	„ 16	2,311	2,561	+ 250	41	111,086	+ 15,058
Hull Corporation	„ 15	3,074	3,269	+ 195	41	128,335	— 1,751
Ilford U.D.C.	„ 15	577	635	+ 58	41	26,985	+ 3,044
Ilkeston Corporation ...	„ 19	111	129	+ 18	42	5,659	+ 271
Ipswich Corporation	„ 15	382	473	+ 91	40	22,787	+ 3,716
Isle of Thanet	„ 15	275	256	— 19	16	3,976	— 985
Kilmarnock Corp.	„ 15	143	158	+ 15	35	5,944	+ 211
Lanarkshire	„ 13	1,668	2,068	+ 400	2	4,516	+ 488
Lancashire United	„ 12	1,440	1,593	+ 153	2	2,945	+ 167
Leeds City.....	„ 15	8,186	8,893	+ 707	42	373,489	+ 29,032
Leicester Corporation ...	„ 15	2,824	3,173	+ 349	2	7,088	+ 961
Leith Corporation	„ 15	641	759	+ 118	35	27,077	+ 1,946
Leyton U.D.C.....	„ 13	1,499	1,516	+ 17	41	66,633	+ 9,359
Liverpool Corporation...	„ 15	12,411	13,672	+ 1,261	2½	30,065	+ 2,437
Llandudno & Colwyn B.	„ 14	167	187	+ 20	6½	1,182	+ 53
London County Council	Sept. 22	41,976	46,960	+ 4,984	25	1,095,822	— 4,285
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	Jan. 15	170	127	— 43	14½	1,990	— 720
Maidstone Corporation..	„ 13	160	195	+ 35	41	9,074	+ 368
Manchester Corp.....	„ 15	16,580	17,579	+ 999	40	742,649	+ 25,156
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	„ 15	155	182	+ 27	41½	8,122	+ 425
N'castle-on-Tyne Corp.	„ 15	5,719	5,823	+ 104	41	258,931	+ 27,669
Newport (Mon.) Corp....	„ 15	754	862	+ 108	42	35,162	+ 1,132
New St. Helens & Dist.	„ 12	784	919	+ 135	28	29,257	+ 2,991
Northampton Corp.....	„ 14	564	681	+ 117	41⅔	30,114	+ 5,196
Nottingham Corp.....	„ 13	3,313	3,747	+ 434	41	154,142	+ 11,619
Oldham Corporation ...	„ 16	2,070	2,290	+ 220	43	97,626	+ 4,487
Portsmouth Corp.....	„ 15	2,159	2,239	+ 80	42	103,811	...
Preston Corporation.....	„ 12	897	1,050	+ 153	41	40,169	+ 2,039
Provincial	„ 15	1,932	2,144	+ 212	15½	31,692	+ 2,191
Reading Corporation.....	„ 13	700	783	+ 83	40½	32,867	+ 3,469
Rhondda Tramways.....	„ 6	955	1,002	+ 47	1	1,002	+ 47
Rochdale Corporation...	„ 8	1,499	1,703	+ 204	39½	69,320	+ 3,244
Rotherham Corp.....	„ 19	942	1,272	+ 330	42	49,708	+ 6,407
Salford Corporation.....	„ 17	4,741	5,154	+ 413	41⅔	217,469	+ 9,250
Sheffield Corporation. ...	„ 16	7,917	9,667	+ 1,750	42⅔	383,098	+ 52,650
Southampton Corp.....	„ 12	1,214	1,508	+ 294	41	62,169	+ 7,119
Southend-on-Sea Corp...	„ 12	606	607	+ 1	41	33,844	— 7,958
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 8	727	804	+ 77	40⅔	32,395	+ 1,355
Sunderland Corp.....	„ 16	1,282	1,481	+ 199	42	63,128	+ 1,404
Sunderland District.....	„ 12	481	569	+ 88	11	6,251	+ 519
Swindon Corporation ...	„ 12	168	187	+ 19	41	8,177	+ 744
Torquay Tramways.....	„ 6	386	394	+ 8	1	394	+ 8
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	„ 12	492	498	+ 6	2	864	— 64
Wallasey Corporation ...	„ 15	1,059	1,088	+ 29	41⅔	53,283	+ 1,014
Walsall Corporation.....	„ 15	697	824	+ 127	3	1,785	+ 214
Walthamstow U.D.C....	„ 8	723	789	+ 66	41	36,558	+ 3,553
Warrington Corp.....	Dec. 30	410	513	+ 103	39	18,097	+ 939
West Ham Corporation	Jan. 13	2,841	2,989	+ 148	41½	127,922	+ 10,858
Wigan Corporation	„ 13	1,384	1,572	+ 188	41	63,746	+ 3,323
Wolverhampton Corp....	„ 19	1,025	1,142	+ 117	42	47,508	+ 2,878
Yorkshire (W. Riding)...	„ 16	1,434	1,521	+ 87	3	5,017	+ 669

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 6.] LONDON, SATURDAY, JANUARY 29, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BELFAST.

TRAMWAY STORES.

The Tramways and Electricity Committee invite tenders for the supply of the undermentioned stores:—

1. Car brass furniture. Polishing and relacquering car fittings.
2. Glass.
3. Timber.
4. Iron and steel.
5. Bolts.
6. Screws, nuts, and rivets.
7. Panel pins and washers.
8. Insulating tapes, etc.
9. Destination indicator screens
10. Rubber goods.
11. Paints (miscellaneous).
12. Transfers and ribbon gold.
13. Oils and grease.
14. Springs.
15. Castings.
16. Paint brushes and cleaning brushes.
17. Forgings.
18. Workshop tools and plant, Emery wheels and files.
19. Copper and brass strip, etc.
20. Electrical accessories, cable and lamps.
21. Belting, rope and twine.
22. Special steel bolts and pins.
23. Ambulance accessories.
24. Soaps.
25. Canvas bags.
26. Leather bags, gauntlets, etc.
27. Miscellaneous hardware.
28. Enamelled iron stop notices.
29. Tramcar axles.
30. Tramcar tires.
31. Tramcar wheel centres.
32. Gears, pinions, and gear cases.
33. Spares for 90M Westinghouse controller; controller fingers and shunts; controller spare parts (manufactured fibre).
34. Spares for No. 200 Westinghouse equipment, armature coils and field coils, spares for auto and canopy switches.
35. Gas and water pipe fittings.
36. Builders' materials.

Forms of tender may be obtained on application to the General Manager, Tramways Department, Napier Street, Sandy Row, Belfast, upon payment of 2s. 6d., which will be returned upon receipt of a bona fide tender.

The Committee do not bind themselves to accept the lowest or any tender. The whole or any part of a tender sent in may be accepted, and tenders shall be open for acceptance by the Corporation until May 10 next.

This tender must be enclosed in an envelope, duly sealed, and addressed to the undersigned, endorsed:—"Tender for Stores, Tramways Department," and must be received in the City Hall, Belfast, not later than 10 o'clock a.m., on Wednesday, February 16, 1916.

An official receipt must be obtained for every tender delivered by hand. Tenders sent by post must be registered.

R. MEYER,
Town Clerk.

City Hall, Belfast.
February, 1916.

Wanted, copies of "THE TRAMWAY AND RAILWAY WORLD," of the following dates:—March, July, and September, 1909; January, 1910; August, September and December, 1911; April and October, 1912; October, 1915, and January 1 and 8, 1916. Address, Box 97, "Tramway and Railway World."

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply of the following:—

(a) Macintoshes, capes, and sou'westers.
(b) Veterinary services.
(c) Oxygen and acetylene gas.
(d) Hire of bicycles,

and general stores, as set forth in the undermentioned schedules, viz.:—

SCHEDULE A.

Motor and controller parts, etc.
Resistances (grid type).
Armature and field coils.
Trolley poles and bases.
Lightning arresters (traction type).
Lamps, car switches, bells, cells, tubing, etc.
Telephones, etc.
Insulating material.
Carbon brushes and carbons.
Overhead equipment material.
Trolley wheels, bushes, and spindles.
Sanding devices.

SCHEDULE B.

Cable (power and lighting), bell wire.
Copper, brass, steel and iron wire, sheet copper and brass, etc.
Galvanized steel cable, etc.

SCHEDULE C.

Timber (including perforated seating), etc.
Handcarts and barrows.

SCHEDULE D.

Lubricants, oils, motor spirit, etc.
Soaps, disinfectants, metal polish, etc.
Paints, white and red lead, varnishes, etc.
Methylated spirits, shellac, etc.
Transfers and English gold leaf.
Ambulance accessories, etc.

SCHEDULE E.

Plate glass, ruby glass, globes, etc
Crucibles, fireclay material, etc.

SCHEDULE F.

Rubber strip, goloshes, gloves, etc.
Rubber tyres for motor vehicles, etc.
Leather belting, etc.

SCHEDULE G.

Workshop and permanent way tools.
Lamps, buckets, cans, and sundry ironmongery.
Car brass furniture (including trolley rope minders).
Cleaning, polishing and lacquering roof light frames.
Grinding blocks, emery wheels, etc.
Enamelled iron plates.

SCHEDULE H.

Iron and steel bars and sheets.
Steel fishbolts.
Bolts, screws, etc.
Truck and sundry springs.
Chains, etc.
Ornamental fences.
Steel stampings, iron and steel forgings, etc.
Anti-friction white metal.
Tinplates, lead, etc.

SCHEDULE I.

Car axles and car wheel tires.
Gear and pinion wheels.

SCHEDULE J.

Iron and steel castings.
Coal and furnace coke.

SCHEDULE K.

Paint, varnish, cleaning and stable brushes.
Sponges, dusters, cotton waste, etc.
Lubricant pads for axle boxes.
Rope, cord, lamp wicks, etc.
Grey duck, twill, linen, scrim, and holland.
Saddlery, etc.
Lurry sheets, sacks and bags.
Hampers, etc.

SCHEDULE L.

Portland cement, chippings, and broken stone.
Sand, bricks, slates, sanitary fittings, etc.

Schedules, etc., may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 10 a.m. on Tuesday, February 15, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
January 28, 1916.

WEST HAM CORPORATION TRAMWAYS.

TRAMWAY RAILS.

Required 600 tons or any less quantity of No. 4 B.S.S. Tramway Rails. Reply giving quantity, date of delivery and price—free on rail, Plaistow Station—to General Manager, West Ham Corporation Tramways, Greengate Street, Plaistow, E.

Digitized by Google

COUNTY BOROUGH OF HALIFAX.

STORES AND MATERIAL.

Tenders are invited for the supply of the following stores and materials required in the Tramways Department of the Halifax Corporation during the twelve months ending March 31, 1917, viz. :—

Schedule No.

1. Iron and steel.
2. Timber.
3. Bolts and nuts.
4. Ironmongery, including nuts, washers, nails, screws, etc.
5. Glass.
6. Lighting fittings.
7. Insulating materials.
8. Vulcanized rubber cable, copper and phosphor bronze wires and steel binding wires.
9. Anti-friction metal.
10. Oils and grease.
11. Paints and varnishes.
12. Painting and cleaning brushes.
13. Cleaning materials.
14. Castings (malleable iron and cast iron), including track brake and wheel-brake blocks.
15. Trolley and overhead line materials.
16. General stores, including rubber window strip, rubber hose, felt pads, etc.

Samples may be seen at the Stores, Skircoat Road Depot any day Monday to Friday, January 24 to 28, and Monday to Friday, January 31 to February 4, 1916, between 9 a.m. and 4 p.m. Forms of Tender and full particulars may be obtained from the Tramways Engineer, Tramways Office, Skircoat Road, Halifax, between the above dates. Intending contractors must state the number of schedule required. Duplicate copies of each schedule may be obtained on application to the Tramways Engineer on payment of 6d. per copy.

Tenders in the envelopes provided must be sent to the undersigned on or before Monday, February 14, 1916.

Any sample submitted by the tenderers (which will not be paid for by the Corporation) must be marked "Sample—Tender for Tramway Stores," and sent to the Tramways Engineer's Office, Skircoat Road, Halifax.

The persons whose tenders are accepted will be required to observe the fair contracts clauses adopted by the Corporation.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
PERCY SAUNDERS,
Town Clerk.

Town Hall, Halifax,
January 8, 1916.

COUNTY BOROUGH OF SOUTHAMPTON.

STORES AND FITTINGS.

The Corporation invite tenders for the supply of the following stores and fittings required in the tramways department during a period of twelve months, according to specifications and conditions to be obtained upon application to the manager, Tramways Offices, 161, Above Bar Street, Southampton.

1. Screws.
2. Files and rasps.
3. Iron and steel.
4. Bolts and nuts.
5. Nails.
6. Castings.
7. Glass.
8. White lead, etc.
9. Vaseline, etc.
10. Cotton waste, rope, etc.
11. Brooms.
12. Leathers, etc.
13. Tools.
14. Timber.
15. Cement.
16. Motor grease.
17. Transfer gold.
18. Whitworth dies.
19. Hack-saw blades.
20. Drills.
21. Bricks.
22. Car oil.
23. Pitch.
24. Creosote oil.
25. Electric lamps.
26. Sea sand.
27. Pit sand.
28. Sea ballast.
29. Pit ballast.

Tenders upon the printed form, endorsed "Tenders for Stores, etc., Tramways Department," must be delivered at the Town Clerk's Office on or before Saturday, February 19, 1916.

No pledge is given to accept the lowest or any tender or tenders, and no tender form will be sent out unless applied for.

R. R. LINTHORNE, Town Clerk.

Town Clerk's Office, Municipal Offices, Southampton.
January, 1916.

BOROUGH OF LEIGH, LANCS.

TURBO-ALTERNATOR, ETC.

Tenders are invited for the supply and erection of the following plant :—

One 2,000 Kw. Turbo-Alternator, 6,600 volts.
One Surface Condenser for above.
One set of pumps for water supply.
One 1,000 Kw. rotary or motor converter switchgear for above.

Specifications and particulars may be obtained from Mr. Arthur T. Smith, Electricity Works. Tenders to be delivered at the Town Hall, addressed to the Chairman of the Electricity Committee, not later than 12 noon, February 18, 1916.

W. H. COWBURN,
Town Clerk.

Leigh, Lancs.
January 25, 1916.

COUNTY BOROUGH OF WIGAN.

TRAMWAYS DEPARTMENT.

MATERIALS AND STORES.

The Tramways Committee of the Wigan Corporation invite Tenders for the supply of the following materials and stores for the year ending March 31, 1917.

Paints, varnishes, etc., and brushes.
Iron and steel.
Tramcar accessories, steel tires, axles, etc.
Brass and iron castings, malleable iron castings and brake blocks.
Oil and grease.
Ironmongery.
Glass.
Overhead line material.

Specifications and forms of Tender may be obtained on application to Mr. Frank Buckley, General Manager, Corporation Tramways, Market Place, Wigan.

Tenders (endorsed with name of article tendered for) to be addressed to the Town Clerk, King Street West, Wigan, and must be received not later than Saturday, February 5, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Wigan,
January 19, 1916.

NEWCASTLE CORPORATION TRAMWAYS.

UNIFORM CLOTHING.

The Tramways Committee of the above Corporation invite tenders for the supply of uniform clothing for Inspectors, Timekeepers, Depot Clerks, Motormen, Male Conductors, and Overhead Linesmen, etc., for the twelve months ending March 31, 1917.

Form of tender and conditions of contract can be had on application to the undersigned.

Specimen uniforms can be seen at the Tramway Offices, Manors, Newcastle-on-Tyne.

Tenders must be sent through the post, addressed to the Chairman of the Tramways Committee, endorsed "Tenders for Uniforms," and must be delivered not later than February 7, 1916.

The Tramways Committee do not bind themselves to accept the lowest or any tender.

ERNEST HATTON,
Engineer and General Manager.

Tramway Offices, Manors, Newcastle-on-Tyne.
January 26, 1916.

COUNTY BOROUGH OF SOUTHAMPTON.

TRAMWAY UNIFORMS.

The Corporation invite tenders for the supply of uniforms for employees of the tramways department. Form of tender may be obtained, and samples inspected, at the Manager's Office, 161, Above Bar Street.

Sealed tenders on the printed form endorsed "Tender for Tramway Uniforms," must be delivered at the Town Clerk's Office on or before February 19, 1916.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office, Municipal Offices, Southampton.
January 25, 1916.

CORPORATION OF LEICESTER.

ELECTRIC TRAMWAYS.

TRAMWAY RAILS.

The Tramways Committee invite quotations for 30 tons of seven-inch steel Girder Tramway Rails to British Standard Specification and of British Standard Section No. 4C (1¼-inch groove), or for rails of a similar section.

Quotations should be addressed as under, and be delivered not later than Saturday, February 5th, 1916.

E. GEORGE MAWBEY, M.Inst. C.E.,
Borough Engineer.

Town Hall, Leicester.
January 24, 1916.

SALFORD CORPORATION TRAMWAYS.

UNIFORMS.

Tenders invited by February 14 for 12 months' supply of uniform (clothing, caps, macintoshes, cash-bags, etc.). Apply to General Manager, Tramway Offices, 32, Blackfriars Street, Salford.

POSITION WANTED.

GENERAL FOREMAN AND FOREMAN PLATELAYER.

General Foreman and Foreman Platelayer, thoroughly experienced in tramway construction and reconstruction and permanent-way repairs, desires employment. First class testimonials.—Address, Box 15, "Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JANUARY 29, 1916.

CONTRACTS FOR STORES.

A number of municipal tramways are now, as is usual at this time of the year, asking for tenders for a supply of stores and goods for the period of twelve months. A brief consideration of the circumstances now prevalent, together with the uncertainty attaching to trade in the future, should convince them that it is impracticable to look so far ahead. Even if it were possible, it is not desirable, having regard to the interests of both tramway undertakings and the manufacturers, to adhere to a procedure that is reasonable enough in time of peace. War is raging in three continents, and consequently the demands on British shipping for the conveyance of troops, munitions, and stores, have greatly increased. The effect of this widespread extension of hostilities has already become apparent in the complaints that have been made that shipping facilities are inadequate for the trade of the Empire. So frequently has this fact been commented upon that the Government have during this week taken steps to secure the better utilisation of shipping. Another difficulty to be faced is that the Military Service Bill, by calling to the colours thousands of single men up to forty years of age who have not attested under the group system, will lessen the supply of labour even in factories engaged on Government work. Further depletions will arise owing to the call that will later have to be made on the services of married men up to the same age limit. This diversion of labour into the ways of war must inevitably bring about a further rise in prices. Nor must purchasers forget that among the manufacturers of tramway stores and goods are controlled establishments, whose owners are unable on that account to devote their attention at all times to civil needs. An exceedingly strong case can be made out for the contention that it is not businesslike procedure to expect tenderers at this critical time to quote prices for a year ahead. Firms who give such quotations are bound to protect themselves by asking for higher prices than would be charged for short periods. Some manufacturers have, we believe, declined to give quotations for a year, because they are unable to obtain contracts for the supply of raw material. Their objection would probably not extend to a quarterly contract, renewal being made according to the prices prevalent at the end of each three months. So far as we are aware the manufacturers have treated tramway authorities quite fairly in the matter of prices during the trying times that have passed since August, 1914. Evidence of this is afforded by a statement made by the chairman of the Great Yarmouth Tramways Committee, who reported having instructed the general manager to advertise for tenders covering a period of twelve months. At the meeting of the Council an amendment was moved that tenders should be made for three months only, whereupon the chairman of the committee announced that when previous tenders had been received the committee were pleasantly disappointed to find that prices did not increase. He added that if prices now proved to be exorbitant, the committee would make only three months' contracts. No objection ought therefore to be taken to allowing contractors a measure of liberty equal to that which committees are claiming for themselves. A conciliatory and mutually helpful policy should prevail on both sides, for it is the only method by which manufacturers will be enabled to surmount the difficulties inherent to a period unexampled in our history.

DEVONPORT ARBITRATION AWARD.

Mr. B. Hall Blyth has issued his award in the arbitration between Plymouth Corporation and Devonport and District Tramway Company to determine the amount to be paid for the Company's undertaking, which had been acquired by agreement. The award directs that the Corporation shall pay the company £103,970 1s. 4d. in respect of:—

(1) The company's tramway undertaking.
(2) The light railway.
(3) The profits the company would have been expected to earn between October 2nd, 1915, and August 12th, 1919.

Each party are to pay their own costs of the reference, and the arbitrator's expenses are to be borne in equal shares by the Corporation and the company.

The award was received by Plymouth Tramways Committee on January 24, when they decided to accept it. A vote of thanks was accorded to the sub-committee and the officials who had been concerned in the arbitration proceedings.

At the Company's annual meeting on January 26, the chairman said that the amount of the award remained as a loan to the Council at 5 per cent.

TRAMCAR ACCIDENTS.

An inquest was held at Rotherham on a man who was fatally injured by jumping off a tramcar at Rawmarsh on January 15 while it was running backward down a gradient of 1 in 10. The motorman stated that when about 60 yards from the top of the hill the car met the full force of the wind in turning a bend. The wind seemed to hold the car, and the controller fired. The electric brake failed to act, as the sand was blown off the rails. He also applied the hand brake, which held the car when it had gone a little way up the opposite incline. He did not apply "the last resort," as there was power on. Mr. P. Priestly, manager and engineer, Mexborough and Swinton Tramways Company, explained that the "last resort" was a very severe method, and one which was only used when everything else had failed. Elsie Foster, the conductor, said she had had six months' experience. When the car began to run back she applied sand to the rails, but the wind blew it away. She asked a man to put on the slipper brake, and he complied. She had received instructions not to apply the hand-brake. She told the passengers not to jump off, and one replied, "We will make the best of it. If she can stick it, we will." The Coroner remarked that one had not time to reflect and consider circumstances such as these, and the girl seemed to have kept her presence of mind. The jury returned a verdict of accidental death.

A number of persons were injured by broken glass on January 20 in a collision between a Bradford car and a Leeds car at the points in front of Thornbury car-shed, Bradford.

One of the passengers injured through a Dudley tramcar overturning, after running away unattended down a hill, died in hospital. The inquest has been adjourned until February 3.

Double Fares on Night Omnibuses.—In order to recoup the Company for the loss entailed by the running of the night omnibus service from Cricklewood to Liverpool Street, the fares have been increased approximately 100 per cent. Fivepenny tickets, however, are only raised to eightpence.

Digitized by Google

L.C.C. TRAMWAY MATTERS.

ENLISTMENT OF STAFF.

On Tuesday the London County Council resumed their fortnightly meetings. The General Purposes Committee reported that in the case of the tramways department, pending the calling up of the respective groups of men of military age who had attested for military or naval service, they had decided that such men might be employed in a temporary capacity, on the understanding that when called up no war service allowance would be paid to them, and that no application would be made for them to be placed in a later group. Up to December 31, 1915, out of a tramway staff of 11,865, 2,458 were on war service, including those who had died or who were missing; 64 were directly employed on munitions work, while 2,071 had attested. Of these, 1,090 had been rejected.

INVITATIONS TO TENDER.

The Stores and Contracts Committee reported that, following the procedure laid down by the Council for the keeping of lists of firms to be invited to tender for the supply of stores and for general maintenance work, they had revised the list by adding the names of certain firms and removing others. The names of three enemy alien firms had been omitted. Up to December 31, 1915, the total number of lists was 253, exclusive of various lists of firms to be invited to tender for special stores or work not included in the ordinary schedules.

ANNUAL REVISION OF SALARIES.

The General Purposes Committee reported that they had suspended for the present year the operation of the rule as to the annual revision of salaries.

SPECIAL SUB-COMMITTEE.

The General Purposes Committee have appointed a special sub-committee to be known as the Soldiers' and Sailors' Care Committee, to inquire and report as to the practicable means by which assistance may be rendered, either by employment or otherwise, to employees of the Council who have served with His Majesty's forces, to such as may be prisoners of war, wounded, disabled or invalided, and to the widows and dependants of such employees who lose their lives.

INSURANCE AGAINST AIR CRAFT.

The Council have approved the expenditure, amounting to £4,490, for premiums in respect of insurances covering property of the tramways undertaking.

MOTOR FIRE APPLIANCES.

The Fire Brigade Committee reported that, following the approval by the Council on November 9, 1915, of a capital estimate of £17,960, for the purchase of motor fire appliances during the financial year 1916-17, they had accepted the offer of Dennis Brothers (1913), Ltd., to supply ten motor fire engines at £975 each, ten motor escape vans at £770 each, and a motor instructional tender for the sum of £506. They have also authorised the purchase from Leyland Motors (1914), Ltd., at a price of £20, of a set of fittings for use on fire escapes, and two spare wheels for motor appliances at a price of £42 18s. 6d.

THROUGH BOOKINGS—CONFERENCE TO AVOID WASTE.

MR. J. D. GILBERT, M.P., asked the Chairman of the Highways Committee:—In view of the arrangements of through fares by the tubes, underground companies, and 'buses, could he state if any negotiations or offers were made to bring the Council's tramways into the arrangement, and (2), what proposals were offered to or considered by the Committee in the matter?

MR. G. HUME (Chairman of the Highways Committee):—The answers to (1) and (2) are in the negative. I would, however, remind the hon. member that there is an agreement in force between the Council, the London Electric Railway Company, and the Metropolitan Electric Tramways Company, Ltd., for through bookings by tube, and, alternatively, tramcar or omnibus, from Charing Cross, via Highgate and Archway-road, to Fortis Green-road. Further, the hon. member will recollect that the Council, on July 27, 1915, decided in view of avoiding waste in men, materials and money, to participate in a conference to be held under the chairmanship of a representative of the Local Government Board with representatives of other traffic authorities and undertakings in London. Discussions with this object are now proceeding. Arrangements have been provisionally made for through bookings between points (1) on the Harrow-road tramways (worked by the Metropolitan Electric Tramways Company, Ltd., but owned by the Council) on the one hand, and the stations on the London Electric Railway and the Metropolitan Railway on the other; (2) on the Council's southern tramways and Leicester-square station (London Electric Railway) and the Mansion House station (District Railway), the transfer of passengers in the latter case being effected at Charing Cross (Embankment) station for Leicester-square station, and Blackfriars station for Mansion House. At the desire of the companies, these arrangements have not been put in force, pending the decision that may be come to in the present conference.

MR. T. GAUTREY asked whether the traffic returns, (given on page 99), were as favourable as they might be. He understood that the number of cars running, as compared with the corresponding period of last year, was considerably fewer, yet the returns were better, both as to passengers and the financial results. Mr. G. H. HUME replied that it might certainly be that they were running fewer car miles at the present moment; he did not know whether or not on more favourable terms, to any extent, but there had been an improvement.

TRAFFIC DIFFICULTIES.

Under the stress of the war there is a danger of the bell and trolley boy disappearing from the Manchester cars. Owing to the demands for youthful labour in the city's trading establishments, the tramways department are experiencing a shortage of lads. To meet the difficulty Mr. McElroy, the general manager, is making an experiment in employing girls of fifteen years of age and upwards.

The abnormal influx of war workers to the Trafford Park district has led to the local authority drawing the attention of Manchester and Salford Corporations to the need for more cars in the early morning. The tramways departments of both Corporations have replied that attention was being given to the matter.

Coventry Tramways Committee have ordered small portable electric lamps to be supplied for the use of the conductors. The question of reducing the service of cars at nights and extending the services in the mornings has been referred to the Wages Sub-Committee, with power to act. The local branch of the Tramway Workers' Union have passed a resolution protesting against the reduction of lighting in the cars and the streets, necessitated by the application of the Defence of the Realm clauses to the city.

Complaints having been made of the inter-running facilities between the Metropolitan Electric Tramways and the northern lines of the London County Council, Mr. W. E. Hammond, traffic manager of the company, has stated that the grumbling is unreasonable in view of the difficulties created by the war.

Glasgow tramways department are taking steps to deal with unruly conduct on the part of some of the workpeople travelling on the Govan route at rush hours. It is alleged that men board the cars at certain points and pay ½d. fare. When they arrive at the place at which they are due to leave they make no attempt to get off the car. As soon as the car starts, however, they go on the platform in a body, blocking the passage and crushing the conductor—generally a woman—into a corner, where she is unable to collect the fares.

In consequence of the new lighting order, the speed of the cars has been reduced at Birmingham from a maximum of 16 to 10 miles per hour. The average speed has been lowered from 7½ to 6½ miles, and it is still less at places where reconstruction work is in progress.

Sunday running has been abandoned at Reading owing to the strain of the week-day working on the men. It was stated at the January meeting of the Council that the men who worked on bank holidays and Sundays had never before had one clear day's rest. They have received £21 11s. as compensation for lost time, and the decrease in the receipts has been about £80.

BOMBAY TRAMWAYS AND INCOME TAX.

Sir J. D. Rees asked the Chancellor of the Exchequer in the House of Commons on January 24 whether he was aware that the Bombay Tramways Company, in order to avoid the payment of double Income Tax, was removing its head-quarters from London to Bombay; whether he was aware that many Colonial companies paid a triple Income Tax; and whether, in view of the probable removal of many more companies and the net loss involved to the trade and revenue of the United Kingdom, he would endeavour to adjust this grievance in his forthcoming Budget.

Mr. McKenna: My hon. friend refers to a company which I understand operates a system of tramways outside the United Kingdom, and which is owned predominantly by persons resident in India. These circumstances suggest that considerations other than the incidence of the British Income Tax may have influenced the company in its decision.

MISCELLANEOUS NEWS AND NOTES.

Cars Stopped by a Flood.—Owing to the bursting of a water main in Uxbridge Road on January 23, tramway and other traffic was stopped for a distance of half a mile between Ealing and Acton.

Transport of Munitions.—At the request of the Ministry of Munitions the War Office have recently formed an additional mechanical transport company of the Army Service Corps, to assist the Ministry in the transport of munitions of war.

L.C.C. Motor Vans for War Service.—The Stores Committee of the London County Council have placed at the disposal of the War Department two motor vans that were in course of construction by Thomas Tilling, Ltd.

Light Railways Order.—The Board of Trade have confirmed the undermentioned Order made by the Light Railway Commissioners:—Milford and St. Bride's Bay Light Railway Order, 1916, authorising the construction of Light Railways in the County of Pembroke from Milford Haven to Saint Bride's Bay.

Middlesbrough Railless Traction Project.—Owing to the delay occasioned by the execution of Government contracts, delivery of the cars ordered for the railless trolley car installation between Middlesbrough and the Eston district is not expected until March next.

Traffic Inducement.—The current issue of the London Traffic Group's folder describes little-known localities behind the Abbey, in Soho, Mayfair, St. James's, the Adelphi, Bankside (Southwark), and Chinatown, behind Limehouse Church. Directions are given for reaching each of the localities by omnibus or electric railway.

The Institution of Automobile Engineers.—The next meeting will be held on Wednesday, February 9, at the Royal Society of Arts, John Street, Adelphi, W.C., at 8 p.m., when Mr. W. D. Williamson will read a paper entitled "Petrol Engines for Commercial Vehicles."

Digitized by Google

Cards of invitation to the meeting may be obtained on application to the Secretary of the Institution, 28, Victoria Street, Westminster, S.W.

Lektrik Lighting Connections.—Messrs. A. P. Lundberg & Sons, 477–489, Liverpool Road, London, N., have issued the fourth edition of the pocket handbook under the above title. It is priced at sixpence, and in four years 35,000 copies have been printed. Several pages have been added to the present edition on the subject of automobile controls. The usefulness of the publication to those who are connected with the electrical industry is shown by the large number of men who undergo the examinations instituted by the publishers.

Reading Uniforms.—The female conductors wear uniforms of navy blue serge coats and skirts, melton pilot cloth overcoats piped with red, and blue melton cloth uniform caps with glazed leather peak. The two inspectors' costumes are similar to those of the conductors, but the overcoats are blue melton cloth trimmed with half-inch braid. Their caps are of the same design as the male inspectors. The cost of a complete outfit for an inspector is £4 4*s.* 5*d.*, and for a conductress £3 2*s.* 9*d.*

A Birmingham Extension Completed.—Messrs. Dick, Kerr and Co., Ltd., have completed the construction of an extension of the Birmingham Tramways, from Stratford Road to Shirley Road, Acock's Green, a distance of two miles one furlong. For the most part it consists of double track. The number of the route will be 44, and the city terminus will be either in Station Street or High Street, the full fare being 2½*d.* On account of the shortage of labour only a limited service will be run.

Electric Tipping Wagon for South Shields.—The Corporation of South Shields have adopted the recommendation of the Electricity Committee to expend £850 on the purchase of an electric tipping wagon for the conveyance of ashes from the electricity wores. We learn from Mr. H. S. Ellis, the borough electrical enginekr, that no recommendation has been submitted for the borrowing of £1,850 for the carrying into effect of a scheme for hiring out electric vehicles. The Committee's recommendation was for the borrowing of £1,000, to be used for purchasing motors to be hired out for the driving of machinery.

Tramways and the Munitions Act.—Chesterfield Council have made an application to the Ministry of Munitions for the tramways undertaking to be constituted a controlled establishment. It is doubtful whether the whole undertaking can be so dealt with. Under the amendment of the Munitions Act, adopted by the House of Commons on January 4, the definition of munitions work is extended to light, power, and tramways facilities, "only in cases where the Minister of Munitions certifies that such supply is of importance for the purpose of carrying on munitions work, and the erection of buildings, machinery, and plant required for such supply."

Voltage on Live Rails.—With reference to the voltage on live rails in the working of an electric railway, we understand that while the Board of Trade have made no regulation preventing the introduction of any system employing a higher tension than 1,200 volts, they are advised that it is desirable some experience should be obtained in this country with 1,200 volts before this is exceeded. The statement is of interest in view of the use of 1,200 volts on the direct current system for the Manchester-Bury line of the Lancashire and Yorkshire Railway Company. A complete account of this electrification, together with 56 illustrations, appeared in THE TRAMWAY AND RAILWAY WORLD dated January 13.

West Ham Cars and the Lighting Difficulty.—The West Ham Corporation tramcars working on the routes running into the London County Council terminus at the Aldgate boundary of the city have for some months been showing the route number on the dashlight of most of the cars. We believe that the Leyton and Walthamstow managements have also been giving this method a trial, owing to the compulsory reduction of the power of the lamp in the box illuminating the route number on the upper deck. An advantage of the plan of repeating the route numerals on the dashlight is that they never exceed two figures, and can therefore be plainly seen.

Sheffield's Combined Power Station.—Sheffield Corporation having applied for a Provisional Order to enable the Kelham Island Power station to be transferred from the Tramways Committee to the Electric Supply Committee, a Local Government Board inquiry was held on January 21. It was explained that the amalgamation was agreed upon in the hope of securing greater efficiency and economy. The Lord Mayor (Councillor F. A. Warlow) stated that the scheme was now in operation, and there was no reason to regret the step. Evidence was given that £331,641 of capital outlay would be transferred to the Electric Supply Committee, and against that total there would be credit for £80,000 repaid and £19,000 sinking fund. Mr. A. R. Fearnley, manager of the tramways department, in giving statistics of the tramway traffic, stated that although fewer cars were being run in the city at certain times of the day, the number was largely increased at other times when the munition workers wanted travelling facilities. Owing to the increased number of munition workers, the system was making records every week. On January 19, for instance, the number of passengers carried was greater than on any previous week-day. The total number of passengers during the week ended January 10 was 2,613,362 as compared with 2,146,166 in the corresponding week of 1915, an increase of 467,196.

Women Tramway Workers.—Not more than twenty women are at the start being given instruction to fit them for the work of car conductors at Bradford, although nearly 800 men are affected by the Military Service Bill. Before being selected the women were examined by a lady doctor, and they passed an examination in arithmetic. They receive instruction in the school established for the rapid training of male conductors soon after the outbreak of the war, and for acquiring practical experience they go out in a special car with an inspector and the woman superintendent. Active service will first be undertaken on the Leeds Road route from Thornbury to Bradford, and on some of the through cars to Baliff Bridge. With the exception that they will have double time for meals, the women will work the same number of hours as the men do.

Arbitration on Collision Damage.—Arbitration proceedings took place at Pontefract on a claim made by Mr. B. Hobson, show proprietor, for £448 damages sustained owing to a car of the Yorkshire (West Riding) Tramways Company running into his exhibition in Pontefract Corn Market on November 4. The Tramways Company made an offer of £250. The show was pitched just beyond the point at which the cars ceased to run on fair days. Included in the claim was an amount put down as profits at four other towns that were afterwards to have been visited. Owing to manufacturers being engaged on army work, Hobson said he had not been able to get another tent, and the show had been left derelict since the mishap. Mr. C. Orton, the arbitrator, of Burton-on-Trent, has reserved his decision.

Objection to Double-deck Cars.—In answer to strong objections, urged by Colwyn Bay Urban Council and by the local member of Parliament, to the proposal of Llandudno and Colwyn Bay Light Railways Company to run double-deck cars, the Board of Trade have replied that they see no reason to alter their view that such cars might be allowed. Mr. A. W. R. Lovering, secretary to the company, in a letter to the Board of Trade, stated that in other districts, similar in all respects to Colwyn Bay, it is the almost universal practice to use double-deck cars, and no objections to their use have been made. The communication continued: "We wish to remind your honourable board of the very heavy expenditure forced upon the company by the local authorities and the restrictions as to passing places and double track. These restrictions make the use of double-decked cars all the more necessary, especially to enable the company to deal with rush traffic."

Motormen of Military Age.—A joint deputation from the Tramways and Light Railways Association, the Municipal Tramways Association, and the British Electrical Federation recently waited upon the Reserve Occupations Committee for the purpose of urging the importance of retaining a sufficient number of motormen and other skilled men in order to carry on the various tramway services, which, in many cases, involves the conveyance of men to munitions and other Government workshops. Returns were submitted showing that there are 11,638 drivers employed on municipal tramways, of whom 7,000 are of military age. Company undertakings employed 3,356 motormen, of whom 1,983 are of military age. The number now employed is considerably below the total employed in normal times. A number of the men given as being of military age have been rejected by the military authorities on various grounds.

Douglas Southern Electric Tramways.—Mr. T. J. Hutchinson, chairman of the directors stated at the annual meeting that the past year's working had resulted in a loss of £1,188. Shortly after Whitsuntide the Government announced that they could only permit one mail steamer to run daily on the Isle of Man service. The directors accordingly reduced expenditure to the lowest possible limit, but unfortunately a large proportion of the season's expenses had already been incurred—hence the heavy deficit. The number of visitors fell off from 600,000 in 1913 to 33,000 last year, and the latter number included soldiers. Most of the employees had gone to the front, and it was to the credit of the staff to point out that they had voluntarily offered to accept reduced salaries during the war. A good deal of the money that had been spent during the year would have had to be spent in the near future, and such expenditure will not be required again for a long time. The line and everything belonging to it are in the best of repair. The directors had not accepted any fees.

Tramway Employees' Wages.—A special committee of Bradford Corporation, presided over by Alderman J. Hill, M.P., have recommended the Council to amend the scale of bonuses as follows:—Male workers under 19 years of age, 2*s.* per week bonus, over 19 years of age, 3*s.* per week where wages do not exceed £3 per week; in the case of female employees 2*s.* per week bonus all round. Among the applications was one from the tramways employees requesting an advance of a penny per hour in respect of men paid by the hour and 5*s.* in the case of employees receiving weekly wages. Under the scheme adopted soon after the outbreak of the war a bonus of 1*s.* was paid to employees in receipt of weekly wages of 21*s.* or less, 3*s.* to those receiving between 21*s.* and 30*s.*, 2*s.* between 30*s.* and 35*s.*, and 1*s.* between 35*s.* and 40*s.* The total cost has varied from £30,000 to £25,000 a year. In connection with the tramwaymen's application, Mr. C. J. Spencer, general manager, had presented a report giving the cost of conceding the men's demands as £12,616 per annum. Since 1909 the percentage of wages to total revenue had risen from 33 per cent. to 38 per cent. and the percentage of wages to total expenditure from 47 per cent. to 51 per cent.

London Traffic Group.—At meetings of the Metropolitan District Railway, London Electric Railway, City and South London Railway, and the London General Omnibus Company, held on January 21, resolutions were passed approving of the agreement with respect to the application of the receipts of the companies and the payment into a common fund of the balances for each half-year, after providing for expenses of administration. The agreement was made in pursuance of the Act passed last year. Presiding at the meeting of the first-mentioned company, Lord George Hamilton pointed out that if in future any unforeseen misfortune should

Digitized by Google

temporarily overtake any one of the companies which make it impossible to earn sufficient to meet their expenses and interest on all their preference and other prior stocks the deficiency will become first charge on the common fund. In other words, as long as the combined earnings were sufficient the interest and dividends on these stocks would be secured. At the meeting of the London Electric Railway Company, the chairman (Lord Farrer) said the agreement provided for through traffic and fares. In 1914 the companies carried 819 millions of passengers, of whom only 42 millions or 5.13 per cent., were through passengers between the systems concerned. The proposed arrangement does away with any need of apportionment, and made it possible to establish a simple and effective system of through tickets.

PERSONAL.

Mr. S. Joyce Thomas has found it necessary, owing to his military duties, to resign his membership of the Highways Committee of the London County Council.

Mr. W. F. Long has been appointed general manager at Cape Town of the Cape Electric Tramways, Ltd. For nearly fourteen years Mr. Long has held the position of city electrical engineer at Cape Town.

Mr. S. J. Clunas, station engineer at the electricity works of the Cape Town Municipality, has been appointed acting city electrical engineer owing to the appointment of Mr. Long, the electrical engineer, as general manager of Cape Town Tramways.

2nd-Lieut. A. R. Courtenay, lately acting manager of the General Electric Company's publicity department, has for two months been serving in France with the Royal Naval Air Corps. He recently transferred to the A.S.C. and proceeded to the Mediterranean Expeditionary Force.

Alderman J. Hill, on January 21, was returned without opposition as Member of Parliament for the Central Division of Bradford, to fill the vacancy caused by the death of Sir George Scott Robertson. The new M.P. has taken a prominent part in the development of the city's tramways.

Mr. J. Terry, district traffic superintendent, southern section of the London County Council tramways department, who will attain the age of 65 years on March 2, 1916, is to be retained up to March 2, 1917. The Highways Committee made a recommendation to that effect at this week's meeting of the Council, and it was agreed to.

Economy at Preston.—To fill the vacancy created by Mr. J. Lafferty, traffic superintendent, having accepted the appointment of traffic manager at Edinburgh, the Preston Tramways Committee have recommended to the Town Council that Inspector C. H. Manning be appointed chief inspector, Mr. H. Alston chief traffic superintendent, and that part of the duties lately performed by the superintendent be taken over by the chief cashier, Mr. W. E. Walker.

Mr. W. M. Milnes, electrical engineer to Coventry Tramways and electricity undertakings, has been refused permission by the Tramways Committee to apply, for a commission in the Army. Mr. H. W. Wale, vice-chairman of the committee, has explained to the Corporation that Mr. Milnes could not be spared. Mr. T. R. Whitehead, the engineer and general manager, was prepared to take on the work, but the committee would not permit him as he was already "doing the work of a man and a half."

Mr. R. F. S. Venner died on January 24, after a long period of indifferent health. He was greatly esteemed, and was the son of Colonel Venner, of the Indian Army. Mr. Venner, who was one of the original pupils of Faraday House, was inventor of a number of electrical signs. He was the London agent for meters used in recording power consumption on tramcars.

CONTRACTS AND ORDERS.

C. C. Vandervell & Co., Ltd., have received a large repeat order for electric lighting sets from the London General Omnibus Company.

Messrs. Heenan & Froude have received a contract for the supply of an air filter to the Electricity and Tramways Committee of Dewsbury Council.

ELECTRIFICATION ON THE NORFOLK AND WESTERN RAILWAY.

24 pp. and cover. 13½ in. by 9¾ in.

With Map, 7 Drawings and 20 Half-tone Illustrations.

Price 2/-

Reprinted from THE RAILWAY AND TRAMWAY WORLD.

One of the most complete and comprehensive electric railway articles that has come under our notice. Particulars are given of the Vivian-Bluefield equipment with single-phase transmission and three-phase motors.—*Electrical Industries.*

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

The Acetylene Illuminating Company have received an order from Swindon Council for an acetylene gas plant at a cost of £41, for use in connection with the repair of the tramway track.

Cape Town Municipality have placed a contract with the South African General Electric Company for supplying a British Thomson-Houston turbo-alternator, at £12,160, and with Messrs. Sykes & Co. for supplying a motor converter at £3,050, made by Messrs. Bruce Peebles & Co., Ltd., who have supplied two similar machines to Cape Town Council.

FINANCIAL REPORTS AND MEETINGS.

Brazilian Traction Company.—The Brazilian Traction, and Light, Power Company have declared a dividend of 1 per cent. on the ordinary stock. The rate is in accordance with a statement made some time ago by the directors.

L.C.C. Tramway Receipts.—At the London County Council on Tuesday the Highways Committee reported that the tramway receipts from April 1, 1915, to January 12, 1916, were £1,817,620, as against £1,821,244 for the corresponding period of the previous year, a decrease of £3,624. For the five weeks ended January 12, the number of passengers was 54,291,778, an increase of 1,431,465 over the corresponding period of 1914-15; while the receipts were £228,425, an increase of £6,251.

Traffic Receipts in Berlin.—The published receipts of the Great Berlin Tramways Company for 1915 show a gross total of £2,102,000. This sum is £57,000 in excess of the receipts for 1914, and £121,000 below the figures for 1913. On the Elevated and Underground Railway the gross receipts in 1915 were £452,000, a decrease of £52,000 on 1914 and £16,000 on the preceding year. The General Omnibus Company's takings were £362,600, or £221,000 and £301,000 less than in the two previous years. The explanation of these decreases is the great impressment of motor-omnibuses and horses. The tramways company and the railway company each hold one-third of the ordinary shares of the omnibus undertaking.

Edinburgh and District Tramways Company.—The statement of accounts for the year ended Dec. 31, 1915, shows total receipts £311,877, and expenditure £283,757, as against £312,990 and £276,672 respectively, in 1914. The expenditure included £114,174 for Corporation charges, for rent, etc. On the profit balance of £28,120 there was a decrease of £8,198, as compared with the year 1914. Receipts per mile run were equal to 11.63d., and the expenditure to 10.58d., while the profit equalled 1.05d. per mile run. The percentage of expenditure to receipts was 90.98. The number of miles run was 6,437,644, a decrease of 226,337, and the passengers numbered 66,516,137, being a decrease of 1,086,779. Out of the sum of £3,193 at the credit of the preferred shareholders, the directors recommend the payment of a dividend at the rate of 5½ per cent. per annum, and an additional dividend of 1½ per cent. for the year. A dividend of 2*s.* per share is recommended out of the sum of £2,892 at the credit of the deferred shareholders, leaving £1,142 to be carried forward to their credit. Nearly 500 of the employees are serving with the colours and the sum of £5,432 was paid in allowances to their dependants.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended January 15, the latest period for which full returns are available, give total receipts of £177,410, or £18,406 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £77 8*s.* 1*d.* per mile of single track, and last year at the rate of £70 3*s.* 4*d.*, thus showing an increase for the week of £7 4*s.* 9*d.* per mile open. The principal London tramways have temporarily discontinued the publication of traffic returns.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Jan. 27	A Week Ago.
5%	5%	Alabama Traction, Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	63½	63½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	8 3/9	8 1/3
4%	4%	Do. 4% Deb. ...	100	91	71	70½
4½%	4½%	Do. 4½% Deb. ...	100	98½	77½	77½
5%	5%	Do. 5% Deb. ...	100	96	80	80½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/16	19/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94½	94½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10 1/16 xd	10 1/16
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98	98
$½	$½	Brazilian Trac. & Power Ord....	$100	66	52xd	52½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	90	91½
4/-	4/-	Brisbane Elec. Trams. Old. ...	5	7½	6 9/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	90½	90½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	40	40
5%	5%	Do. 5% Cum. Pref.	100	103	57½	58xd
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	65
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75	76½
70/-	70/-*	Do. 7% Pref.	100	55½	47½	46
—	—	Do. 6% Pref. Ord.	100	17½	15	15½
—	—	Do. Def. Ord.	100	11	10	10
5%	5%	Do. 5% Deb.	100	92	82½	82½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87	87
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6 1/16	6 1/16
1/3	1/3	City of B.A. Trams.	5	5½	92/	92/6
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	8¼	8½
6/-	6/-	Dublin United Trys 6% Pref.	10	—	£11	£11
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	77½	77½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	9/15/6	9/15/6
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	86½	86½
9¾d.	9¾d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/64	2/-	1/9
6d.	6d.	Do. 5% Pref.	1	9/16	9/3	8/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	56½	58½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	84½	84
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55.	51	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103½	103½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	62	69
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	74¾	73½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	82½	82½
$1½	$1½	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	45	46
6%	6%	Do. 6% Mt. Bds.	100	76	39½	39½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½	94½
1/2*	1/2½*	National Steam Car	1	15/32	12/-	13/6xd
9¾d.*	9¾d.*	New General Traction	1	⅞	7/9	7/9
1/2½	6d.	Northern Gen. Trans. Ord. ...	1	3/8	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4½	67/6	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	8¼	8¼
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/-	10/-
8d.	10d.	Provincial Trams. Ord.... ...	1	⅝	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	87½	87½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74	77
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	87½	87½
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	¼	2/7½	2/9½
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	—	—
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77½	78
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅞	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4½	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Increase or Dec.
Anglo-Argentine	Jan. 21	£49,823	£47,515	3	£148,595	— £5,439
Auckland (28 days)	Dec. 17	20,414	21,804	24	125,840	+ 908
Ballarat and Bendigo	Nov. 7	3,835	3,586	32	25,097	— 2,670
Brazilian Traction Mlrs.	Nov.	5,929,730	6,336,000	48	70,586,110	+ 3,245,122
Brisbane	Dec.	30,890	33,960	52	372,034	+ 23,923
British Columbia $	Nov.	648,485	562,782	22	2,636,479	— 688,357
Buenos Aires Lacroze	Dec. 6	44,000	43,528	26	250,930	— 1,836
Burmah Tramway Rs.	Jan. 22	3,446	3,475	...	89,016	+ 7,163
Calcutta Rs.	„ 22	61,092	68,070	3	219,026	+ 15,104
Cape Town	Dec.	...	16,589	...	...	...
Carthagena & Herrerias	Dec.	1,255	2,129	52	21,968	— 3,354
Cordoba	Nov.	12,468	13,785	30	111,123	+ 3,784
East India	Dec.	1,839	2,062	22	10,516	+ 549
Hong Kong $	Dec. 18	9,813	10,796	51	560,151	— 7,371
Kalgoorlie	Oct.	2,525	2,675	44	27,791	+ 1,286
La Plata	Dec.	4,452	4,564	52	51,400	— 3,984
Lima	Nov.	29,712	30,703	48	351,169	— 9,612
Lisbon Escu.	Nov.	...	170,130	...	...	...
Madras (14 days) Rs.	Jan. 15	28,435	34,257	52	743,234	+ 48,178
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Sept.	...	61,211	...	...	...
Mexico $	*	...	...	...	...	...
Montevideo	Dec	28,605	31,305	8	59,712	+ 4,026
Port Elizabeth	Dec.	...	4,360	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Dec.	4,492	4,459	52	57,735	— 1,786
Shanghai $	Dec. 15	23,109	28,058	...	...	...
Singapore $	Dec. 25	9,270	11,309	...	592,612	+ 17,663
Toronto $	Nov.	824,634	851,113	48	8,793,719	— 502,658
Winnipeg	Nov.	330,398	323,025	48	3,122,620	— 610,281

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1914-15	Latest Return. 1915-16	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Incr. or Dec.
Aberdeen Corporation	Jan.	£1,500	£1,677	+ £177	33	£60,278	+ £3,836
Accrington Corp.	Dec. 29	555	617	+ 62	39	21,750	+ 607
Ayr Corporation	Jan. 22	211	257	+ 46	36	13,865	+ 881
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 23	1,187	1,414	+ 227	42½	58,915	+ 5,093
Birmingham Corp.	„ 22	12,173	15,707	+ 3,534	43	613,763	+ 92,014
Blackburn Corp.	„ 19	1,012	1,076	+ 64	42⅔	54,193	— 125
Blackpool & Fleetwood.	„ 22	266	291	+ 25	3	1,062	+ 80
Blackpool Corp.	„ 20	571	697	+ 126	43	71,424	+ 2,255
Bolton Corporation	„ 23	2,885	2,665	+ 280	43	115,363	— 793
Bournemouth Corp.	„ 26	1,614	1,910	+ 296	43	91,541	+ 4,779
Bradford Corporation	„ 22	5,680	6,345	+ 665	42	276,013	+ 11,257
Brighton Corporation	„ 23	778	896	+ 118	42½	47,610	+ 691
Bristol	„ 21	7,587	9,384	+ 1,797	3	28,489	+ 2,328
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	„ 22	1,406	1,569	+ 163	43	68,787	+ 2,808
Burton-on-Trent Corp.	„ 23	258	286	+ 28	43	12,261	— 300
Bury Corporation	„ 23	1,142	1,278	+ 136	43½	57,799	+ 124
Cardiff Corporation	„ 22	2,393	2,737	+ 344	42	115,305	— 1,428
Chatham & District	„ 20	945	1,075	+ 130	3	3,033	+ 148
Chesterfield Corp.	„ 20	243	262	+ 19	42	11,440	+ 73
Colne Corporation	„ 8	220	246	+ 26	...	...	...
Cork Electric	„ 20	422	462	+ 40	3	1,346	+ 38
Croydon Corporation	„ 7	1,670	1,778	+ 108	40	74,399	+ 4,646
Derby Corporation	„ 22	901	1,060	+ 159	42⅔	44,931	+ 1,875
Dover Corporation	„ 22	235	259	+ 24	42	13,204	+ 2,23
Dublin & Lucan	„ 21	111	112	+ 1	3	340	— 16
Dublin United	„ 21	5,506	6,018	+ 512	3	18,230	+ 1,129
Dundee City	„ 19	1,178	1,304	+ 126	35⅔	48,824	+ 2,775
East Ham Corporation	„ 22	1,204	1,294	+ 90	42⅔	55,575	+ 5,726
Exeter Corporation	„ 21	295	338	+ 43	42	16,005	+ 872
Gearless Motor 'Buses	*	...	...	...	...	...	...
Glasgow Corporation	„ 22	19,969	21,744	+ 1,775	34	736,896	+ 53,977
Glasgow Subway	„ 22	1,103	1,219	+ 116	3	3,910	+ 427
Glossop (U. Elec. Supp.)	„ 22	103	132	+ 29	4	543	+ 109
Halifax Corporation	„ 18	1,980	1,961	+ 31	41⅔	93,267	+ 811
Hastings & District	„ 21	701	701	nil	3	2,299	+ 104
Huddersfield Corp.	„ 22	2,337	2,620	+ 283	42	113,706	+ 15,841
Hull Corporation	„ 22	2,961	3,219	+ 258	42	131,555	— 1,492
Ilford U.D.C.	„ 22	532	629	+ 97	42	27,615	+ 3,128
Ilkeston Corporation	„ 26	106	129	+ 23	43	5,788	+ 294
Ipswich Corporation	„ 22	367	482	+ 115	41	23,269	+ 3,533
Isle of Thanet	„ 22	237	241	+ 4	16	4,217	— 981
Kilmarnock Corp.	„ 22	142	157	+ 15	36	6,101	+ 226
Lanarkshire	„ 20	1,714	2,076	+ 362	3	6,592	+ 850
Lancashire United	„ 19	1,491	1,596	+ 105	3	4,548	+ 260
Leeds City	„ 22	7,925	8,875	+ 950	43	382,368	+ 29,922
Leicester Corporation	„ 22	2,776	3,234	+ 458	3	10,323	+ 1,413
Leith Corporation	„ 22	627	752	+ 125	36	27,829	+ 2,072
Leyton U.D.C.	„ 20	1,519	1,506	— 13	42	68,139	+ 9,846
Liverpool Corporation	„ 22	12,384	13,744	+ 1,360	3½	43,809	+ 3,797
Llandudno & Colwyn B.	„ 21	168	195	+ 27	7½	1,377	+ 80
London County Council	„ 12	46,191	45,945	— 246	41	1,817,620	— 3,624
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	Jan. 22	143	129	— 14	15½	2,120	— 734
Maidstone Corporation	„ 20	154	177	+ 23	42	9,251	+ 391
Manchester Corp.	„ 22	16,547	17,900	+ 1,353	42	760,549	+ 26,516
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	„ 22	145	201	+ 56	42½	8,323	+ 481
N'castle-on-Tyne Corp.	„ 22	5,584	5,868	+ 284	43	264,800	+ 27,953
Newport (Mon.) Corp.	„ 22	707	876	+ 169	43	36,038	+ 1,300
New St. Helens & Dist.	„ 19	809	911	+ 102	29	30,168	+ 3,093
Northampton Corp.	„ 21	541	701	+ 160	42⅔	30,815	+ 5,356
Nottingham Corp.	„ 20	3,296	3,735	+ 439	42	157,878	+ 12,059
Oldham Corporation	„ 22	1,985	2,309	+ 324	44	99,934	+ 4,810
Portsmouth Corp.	„ 22	1,993	2,175	+ 182	43	105,986	...
Preston Corporation	„ 19	884	1,004	+ 120	42	41,173	+ 2,159
Provincial	„ 22	1,813	2,066	+ 253	16½	83,758	+ 2,430
Reading Corporation	„ 20	618	769	+ 151	42⅔	33,636	+ 3,619
Rhondda Tramways	„ 13	1,090	1,183	+ 93	2	2,185	+ 140
Rochdale Corporation	„ 22	1,443	1,659	+ 216	40½	72,595	+ 3,584
Rotherham Corp.	„ 26	914	1,258	+ 344	43	50,966	+ 6,751
Salford Corporation	„ 24	4,583	5,222	+ 639	42⅔	222,690	+ 9,720
Sheffield Corporation	„ 23	7,767	9,687	+ 1,920	43⅔	392,784	+ 54,546
Southampton Corp.	„ 19	1,187	1,441	+ 254	42	63,611	+ 7,374
Southend-on-Sea Corp.	„ 19	616	591	— 25	42	34,436	— 7,983
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	„ 22	659	732	+ 73	42⅔	33,867	+ 1,509
Sunderland Corp.	„ 23	1,302	1,470	+ 168	43	64,598	+ 1,571
Sunderland District	„ 19	484	543	+ 59	12	6,795	+ 578
Swindon Corporation	„ 19	162	184	+ 22	42	8,361	+ 766
Torquay Tramways	„ 13	403	457	+ 54	2	852	+ 62
Trys. (M.E.T.) 'Buses	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	„ 12	492	498	+ 6	2	864	— 64
Wallasey Corporation	„ 22	1,031	1,163	+ 132	42⅔	54,446	+ 1,146
Walsall Corporation	„ 22	654	815	+ 161	4	2,600	+ 375
Walthamstow U.D.C.	„ 8	723	789	+ 66	41	36,558	+ 3,553
Warrington Corp.	„ 20	421	486	+ 65	42	19,586	+ 1,159
West Ham Corporation	„ 20	2,760	2,987	+ 227	42½	130,909	+ 11,085
Wigan Corporation	„ 20	1,401	1,485	+ 84	42	65,235	+ 3,407
Wolverhampton Corp.	„ 26	962	1,149	+ 187	43	48,657	+ 3,066
Yorkshire (W. Riding)	„ 23	1,352	1,595	+ 243	4	6,613	+ 912

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

Now Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

MEMBER INSTITUTION OF MECHANICAL ENGINEERS;
MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND;
MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS;
MEMBER MUNICIPAL TRAMWAYS ASSOCIATION;
FELLOW PERMANENT WAY INSTITUTION.

FURTHER PRESS OPINIONS:

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON W.C.

ERC POLE PAINTS

As supplied to important Companies at home and abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples and prices on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England.

TRAMWAY SUPPLIES, Ltd.,

Tramway Engineers,

Sole Selling Agents for S. Dixon & Sons' Tramway Material,

160, WOODHOUSE LANE, LEEDS.

Sole Manufacturers of

TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controllers, Leeds."
Telephone: 3488 Leeds.

OVERHEAD LINE MATERIAL AND SUPPLIES.

THE AUTOBUS

IN THE TRAMWAY WORLD.

When "The Tramway and Railway World" was founded in 1892, motor traction was, of course, scarcely dreamt of, but the avowed object of the paper was to encourage all new methods that gave promise of usefulness.

Motor Traffic Section.

In pursuance of that policy the progress of motor traction received early attention. Commenting on the historic motor parade to Brighton in 1896, "The Tramway and Railway World" predicted that

> "It would give a prodigious impulse to transport both by road and rail."

Within a decade this prophecy was abundantly fulfilled and so much space has been devoted to the new industry that in 1906 a special

MOTOR TRAFFIC SECTION

was added. Every illustrated issue thus contains a section devoted especially to motor cars for Public Service, and includes articles on current topics, illustrated descriptions of new types of vehicles and accessories, and the latest news.

Public Service Motor Cars.

The importance of this section will be gathered from the fact that an increasing number of the leading municipal authorities, railway and transport companies, now own and operate large fleets of motor vehicles of various types, including omnibuses, char-a-bancs, motor lorries for the transport of goods, parcel delivery vans, tower wagons, motor street sweepers, etc.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.

For Places Abroad—Thirty Shillings per annum.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 7.] LONDON, SATURDAY, FEBRUARY 5, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BELFAST.

TRAMWAY STORES.

The Tramways and Electricity Committee invite tenders for the supply of the undermentioned stores:—

1. Car brass furniture. Polishing and relacquering car fittings.
2. Glass.
3. Timber.
4. Iron and steel.
5. Bolts.
6. Screws, nuts, and rivets.
7. Panel pins and washers.
8. Insulating tapes, etc.
9. Destination indicator screens
10. Rubber goods.
11. Paints (miscellaneous).
12. Transfers and ribbon gold.
13. Oils and grease.
14. Springs.
15. Castings.
16. Paint brushes and cleaning brushes.
17. Forgings.
18. Workshop tools and plant, Emery wheels and files.
19. Copper and brass strip, etc.
20. Electrical accessories, cable and lamps.
21. Belting, rope and twine.
22. Special steel bolts and pins.
23. Ambulance accessories.
24. Soaps.
25. Canvas bags.
26. Leather bags, gauntlets, etc.
27. Miscellaneous hardware.
28. Enamelled iron stop notices.
29. Tramcar axles.
30. Tramcar tires.
31. Tramcar wheel centres.
32. Gears, pinions, and gear cases.
33. Spares for 90M Westinghouse controller; controller fingers and shunts; controller spare parts (manufactured fibre).
34. Spares for No. 200 Westinghouse equipment, armature coils and field coils, spares for auto and canopy switches.
35. Gas and water pipe fittings.
36. Builders' materials.

Forms of tender may be obtained on application to the General Manager, Tramways Department, Napier Street, Sandy Row, Belfast, upon payment of 2s. 6d., which will be returned upon receipt of a bona fide tender.

Alternative tenders may be sent in for six months or twelve months.

The Committee do not bind themselves to accept the lowest or any tender. The whole or any part of a tender sent in may be accepted, and tenders shall be open for acceptance by the Corporation until May 10 next.

This tender must be enclosed in an envelope, duly sealed, and addressed to the undersigned, endorsed:—"Tender for Stores, Tramways Department," and must be received in the City Hall, Belfast, not later than 10 o'clock a.m., on Wednesday, February 16, 1916.

An official receipt must be obtained for every tender delivered by hand. Tenders sent by post must be registered.

R. MEYER,
Town Clerk.

City Hall, Belfast.
February, 1916.

Wanted, copies of "THE TRAMWAY AND RAILWAY WORLD," of the following dates:—March, July, and September, 1909; January, 1910; August, September and December, 1911; April and October, 1912; October 14, 1915, December 11, 1915, and January 1 and 8, 1916. Address, Box 97, "Tramway and Railway World."

PORTSMOUTH CORPORATION TRAMWAYS COMMITTEE.

The Tramways Committee of the above Corporation invite tenders for the supply of the undermentioned goods from April 1st, 1916, to September 30th, 1916.

Section A.—Ballast, Sand and Grit.
Section B.—Portland Cement (British Manufacture preferred).
Section C.—Brooms and Brushes.
Section D.—Oils (Not Lubricating), Chemicals, Sheet Glass, etc.
Section E.—Smith's Coal and Coke.
Section F.—Timber.
Section H.—Brake Blocks.
Section I.—Engine Packings, Asbestos Goods, etc.
Section J.—General Ironmongery (not including Tools).
Section K.—Welsh, or other Steam Coal.
Section M.—Steel Tramway Tyres.
Section O.—Wood Paving Blocks (Karri, Jarrah and Creosoted Deal).
Section P.—Car Repair Stores.
Section Q.—Insulating Materials, Lamp and Motor Windings.
Section R.—Overhead Line Materials.
Section S.—Lubricating Oils, Greases, etc.
Section T.—Chandlery, etc.
Section U.—Castings and Machined Parts.

The specification and form of tender may be obtained upon application to the Engineer, Mr. V. G. Lironi, M.I.M.E., A.M.I.E.E., Engineer's Office, Vivash Road, Fratton, Portsmouth.

Tenders marked "Tender for ——" to be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on Tuesday, February 15, 1916.

The form of tender must include a declaration that the person making the tender pays the rates of wages and observes the hours of labour and conditions contained in the Corporation Fair Wages Clause.

The Committee do not bind themselves to accept the lowest or any tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth,
February 1, 1916.

CITY OF SHEFFIELD.

TRAMWAYS DEPARTMENT.

UNIFORMS, ETC.

The Tramways Committee are prepared to receive Tenders for the manufacture and supply at fixed prices of Uniform Overcoats, Trousers, Oilskins, and Women Conductors' Overcoats, also Tenders for Motormen's Driving Gloves.

Particulars and Forms of Tender, together with "Conditions of Contract" and Specification may be obtained, and samples of articles giving a general idea of what is required inspected, from February 1 to 10, 1916, between the hours of 10 a.m. and 12 noon and 2 p.m. and 5 p.m. (Saturday 10 a.m. to 12 noon) at the Offices of the General Manager, Tramways Department, Division Street, Sheffield.

Tenders (enclosed in official envelope provided) and accompanied by samples, to be delivered at the Tramways Department, Division Street, not later than Thursday, February 17, 1916.

Any person or firm sending in a Tender will be required to comply with the Council's Form of Clauses respecting Wages, Hours, and Conditions of Labour, and prohibition against assigning or underletting, as set forth in the "Conditions of Contract," a copy of which may be obtained at my Office upon application, AND NO TENDER CAN BE ACCEPTED FROM AN EMPLOYER WHO HAS NOT GIVEN NOTICE TO THE TAILORING TRADE BOARD IN PURSUANCE OF THE TRADE BOARDS ACT, 1909, THAT HE IS WILLING FOR THE MINIMUM RATES OF WAGES FIXED BY THAT BOARD TO BE OBLIGATORY UPON HIM.

Dated this 28th day of January, 1916.

WILLIAM E. HART,
Town Clerk.

Town Hall, Sheffield.

Digitized by Google

STANFORD LIBRARY

COUNTY OF LONDON.

The London County Council invites Tenders for the supply of (1) 6,000 forged steel driving wheel tyres and 4,000 forged steel trailing wheel tyres, during twelve calendar months from the date of acceptance, or (2) alternatively, 3,000 forged steel driving wheel tyres and 2,000 forged steel trailing wheel tyres, for six calendar months from the date of acceptance.

Particulars, Form of Tender, etc., may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

The person whose tender is accepted will be bound by the contract to pay wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list. Particulars of the Council's Standing Orders as to its conditions of tender and contract are given in every issue of the London County Council Gazette. No Tender received at the County Hall after 11 a.m. on Tuesday, February 29, 1916, will be considered. The Council does not bind itself to accept any tender.

JAMES BIRD,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.
January 31, 1916.

COUNTY BOROUGH OF WEST HARTLEPOOL.

TRAMWAYS DEPARTMENT.
TRAMWAY EMPLOYEES' UNIFORMS.

Tenders are invited for the supply and delivery of Uniforms required for the year ending March 31, 1917.

Specification and Form of Tender can be obtained from the undersigned.

Tenders marked "Tramways Uniforms" must be delivered to the Town Clerk, Church Street, West Hartlepool, not later than 12 noon on Friday, February 18.

The Corporation does not bind itself to accept the lowest or any offer.

J. W. SPARK,
Acting General Manager.

Tramways Depôt,
Greenland, West Hartlepool,
February, 1916.

COUNTY BOROUGH OF WEST HARTLEPOOL.

TRAMWAYS DEPARTMENT.
TENDERS FOR SUPPLY OF TICKETS.

Tenders are invited for the supply of Tickets for the year ending March 31, 1917.

Specification and Form of Tender may be obtained from the undersigned.

Sealed Tenders marked "Tickets" must be delivered to the Town Clerk, Church Street, West Hartlepool, not later than 12 noon on Friday, February 18.

The Corporation does not bind itself to accept the lowest or any offer.

J. W. SPARK,
Acting General Manager.

Tramways Depôt,
Greenland, West Hartlepool,
February, 1916.

COUNTY BOROUGH OF SUNDERLAND.

ADVERTISING ON TRAMCARS.

The Corporation are prepared to receive Tenders for the Advertising on the ventilator panels of their tramcars, and upon the backs of the passengers' tickets used upon such cars. Full particulars, and form of agreement, may be obtained from the General Manager, Mr. A. R. Dayson, at his office, Wheaf Sheaf, Sunderland, on payment of 2s. 6d.

Tenders to be delivered to me at the Town Hall, not later than 12 o'clock noon, on Thursday, February 24 next, in sealed envelopes endorsed "Tender for Tramway Advertising."

The Corporation do not bind themselves to accept the highest or any Tender.

H. CRAVEN,
Town Clerk.

Town Hall, Sunderland.
January 31, 1916.

BOROUGH OF LEIGH, LANCS.

TURBO-ALTERNATOR, ETC.

Tenders are invited for the supply and erection of the following plant:—

One 2,000 Kw. Turbo-Alternator, 6,600 volts.
One Surface Condenser for above.
One set of pumps for water supply.
One 1,000 Kw. rotary or motor converter switchgear for above.

Specifications and particulars may be obtained from Mr. Arthur T. Smith, Electricity Works. Tenders to be delivered at the Town Hall, addressed to the Chairman of the Electricity Committee, not later than 12 noon, February 18, 1916.

W. H. COWBURN,
Town Clerk.

Leigh, Lancs.
January 25, 1916.

SOUTH INDIAN RAILWAY COMPANY.

STEEL TYRES.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of Steel Tyres (900), for carriages and wagons.

Specification and form of tender may be obtained at the company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co., Ltd., marked "Tender for Steel Tyres," must be left at the offices of the company not later than one o'clock on Wednesday, February 23, 1916.

The company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 20s. for each copy of the specification.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the company, 3, Victoria Street, S.W.

91, York Street,
Westminster, S.W.
February 1, 1916.

BOROUGH OF SWINDON.

ELECTRICITY AND TRAMWAYS DEPARTMENTS.
SUPPLY OF TRAMWAY UNIFORMS.

The Corporation of Swindon invite tenders for the supply of Uniform Clothing required by the Traffic Staff for the year ending March 31, 1917.

Samples of the articles of uniform required may be inspected at the Electricity and Tramways Offices, Corporation Street, and copies of the general conditions and specification may be obtained on application to the Tramway Manager, Mr. T. Medcalf, at the address below.

Tenders, sealed and endorsed, "Tender for Tramway Uniforms," and addressed to the undersigned, to be delivered at the Town Hall, Swindon, not later than twelve o'clock noon on Wednesday the 23rd inst.

ROBT. HILTON,
Town Clerk.

Town Hall, Swindon.
February 3, 1916.

SALFORD CORPORATION TRAMWAYS.

SUPPLIES.

Tenders invited by February 21, 1916, for twelve months' supply. Miscellaneous Stores, etc.

For list, send stamped addressed envelope to General Manager, 32, Blackfriars Street, Salford.

WHEEL LATHE WANTED.

Wanted, second-hand wheel lathe for turning wheels on axle, about 18 in. throw. Price, etc., to Box No. 36, c/o "The Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

POSITIONS VACANT.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY DEPARTMENT.

The Newport Corporation require the services of Junior Engineers-in-Charge and Switchmen.

Junior Engineers-in-Charge must have served their time as pupils or apprentices in an electricity undertaking, and have had some experience of extra-high-tension 3-phase supply. Wages, £2 2s. per week.

Switchmen must have had experience in the operation of extra-high-tension and low-tension switchboards in stations of not less than 5,000 kw. capacity. Wages, 35s. per week.

Applications in candidates' own handwriting, together with copies of experience and references, to be sent in at once to the undersigned.

War Service Badges will be issued.

A. NICHOLS MOORE,
Borough Electrical and Tramways Engineer.

Town Hall, Newport, Mon.
February 1, 1916.

MILEAGE AND TIMETABLE CLERK.

Wanted a Mileage and Timetable Clerk for a large tramway system in the Metropolitan area. Applicants, must have had considerable tramway experience and preference will be given to men ineligible for military service. Applications, stating age, experience and salary required, together with copies of three recent testimonials, to be forwarded to Box No. 868, c/o "The Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

POSITION WANTED.

GENERAL FOREMAN AND FOREMAN PLATELAYER.

General Foreman and Foreman Platelayer, thoroughly experienced in tramway construction and reconstruction and permanent-way repairs, desires employment. First class testimonials.—Address, Box 15, "Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

Digitized by Google

THE

Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., LT.
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, FEBRUARY 5, 1916.

A MINISTRY OF COMMERCE.

It is a matter for congratulation that the war has already had the effect of awakening the country to shortcomings in its educational and commercial organisation. To leave such matters to be dealt with after the close of the conflict would be a short-sighted policy, for there is evidence that the enemy is preparing to make his re-entry into the world's markets by methods almost as reprehensible as his innovation of waging war by murdering defenceless citizens. In order to secure reforms it is in the highest degree essential that the nation should give a lead to the Government, and that step was taken in no uncertain manner by the great meeting held last Monday under the presidency of the Lord Mayor of London, in order to consider the problems of trade and commerce that will arise after the war. Its representative character may be judged from the fact that there were seven Lord Mayors and Provosts present, seventy Mayors, representatives of fifty-one Chambers of Commerce, of eighty-one trade and industrial associations, eleven High Commissioners and Agents-General, and representatives of ten banks, apart from individual trading, commercial and industrial firms. Complete unanimity marked the proceedings, which are not to be allowed to end with the passing of resolutions; for on the motion of the Lord Provost of Glasgow the meeting appointed a deputation to bring the decisions arrived at to the attention of the Prime Minister. The most important of these affirmed the need for immediate steps by the Government, the Chambers of Commerce, and kindred associations, to formulate a means for the defence and improvement of trade, and for the establishment of a Ministry of Commerce. The latter demand has been put forward for forty years past, and compliance therewith was promised in the King's Speech in 1905. While the prospect of legislation is now more hopeful, the chief necessity is for the business men of the nation to furnish the driving power that will alone secure their purpose. When their immediate object is attained they must continue their activity in order to shape the policy of the department, to which a reformed Consular service should be made responsible so far as the nation's commercial interests are concerned. Little if any good is to be derived by manufacturers from the present system of issuing reports that are nearly two years old. A Ministry of Commerce should be able to assist in formulating an educational course that shall give us travellers thoroughly capable of bringing British interests before the people of every country. The Ministry, too, should be capable of advising upon the imposition of such tariffs on imported goods as may be deemed necessary from time to time, studying the effect thereof and securing revision when requisite. Support for the conclusions arrived at by the Guildhall meetings is given in the report presented by a sub-committee of the Advisory Committee to the Board of Trade, which was appointed to consider the position of twelve industries that were greatly affected by German competition. Another of their recommendations is that Government departments and local authorities should buy only British goods. The extent to which a contrary practice was followed previous to the war is astounding. Even the War Department obtained essential parts of artillery equipment from Austria. Some tramway authorities have also been notorious sinners in that respect; but no doubt they now secretly repent of their action in helping the enemy to build up their commercial and military machine by purchasing their bounty-fed productions. Until the outbreak of the war commercial work performed by the present Board of Trade was a secondary matter. The common conception of the functions of the Board gives it the charge of railway, tramway, and labour matters. That work it can continue to discharge under a more appropriate name.

COLONEL DRUITT'S IMPORTANT SUGGESTION.

In his report on the running away of a Birmingham tramcar at Aston on November 12, Colonel Druitt, the Board of Trade inspector, states that the motorman had had nine years' experience, chiefly on the Aston route. "Although motormen are working long hours for the present, there is," the report says, "no question about his suffering from overstrain on the morning of the accident, for he had a whole holiday on the previous day. I think the accident was entirely due to his bad management of the brakes on the car in question, and possibly also to his not using sand. The pedals which work the sand hoppers are housed so as to be flush with the floor at the conductor's end of the car, so as not to trip passengers up; and to bring them into the working position, the driver when he changes ends lifts up the pedal at his end, gives it a half turn, and it is then in the working position. As the pedal at the driver's end was found to be right home after the accident, it is possible he forgot to place it in the operating position when he changed ends on the car at Villa Road for the return journey.

DRIVING PAST TRAMCARS.

The Manchester Coroner on January 31 held an inquiry into the death of a bank manager. It was stated that deceased had alighted from a tramcar when he was knocked down by a taxicab. The driver said the deceased rushed in front of the cab, and he had no time either to sound the horn or to pull up, although he was travelling at only four miles an hour, before the front of his cab struck the deceased. Addressing the jury, the Coroner spoke of the need of precautions being taken by pedestrians and drivers. The law provided that all persons, whether pedestrians or drivers, had an equal right to the use of the streets, and also equal responsibilities; but both parties must, in view of the increased motor traffic, exercise greater precautions. When motor-cars were driven past stationary tramcars the drivers could not exercise too great care. When passengers were alighting motor-cars should stop until the people had reached the footpath. His complaint was that many drivers did not stop when they ought to, but went forward trusting that pedestrians would get out of the way. The jury returned a verdict of accidental death.

It was only a few weeks ago that the Manchester Watch Committee recommended the Council to consider the advisability of obtaining legislation to deal with the matter. Powers were obtained for that purpose in Glasgow a year or more ago. In the United States bars are placed across the road to protect passengers when alighting. Adverting to the accidents that occur in London, a correspondent suggests that the rule followed in San Francisco should be adopted for the large British towns. This rule is that all vehicular traffic shall halt at a distance of not less than three yards from a tramcar that has stopped to take up or set down passengers, or if the road is sufficiently wide it may proceed slowly past, but at least three clear yards distant from the standing car.

Digitized by Google

BRADFORD TRAMWAYMEN'S WAGES.

In connection with an application for increased wages by the union employees of Bradford Corporation Tramways, Mr. C. J. Spencer, the general manager, has presented a lengthy report, in which some statistics are given of the rates of payment granted by other authorities. The union asked for an immediate advance of 5*s.* a week for the men paid by the week, and a penny an hour for those paid by the hour. The war bonuses allowed are a shilling a week for men under twenty-one years of age, 3*s.* for those in receipt of less than 30*s.* a week, 2*s.* for those between 30*s.* and 35*s.*, and 1*s.* for those receiving between 35*s.* and 40*s.* a week.

After considering Mr. Spencer's report the Tramways Committee referred the matter to a special committee appointed by the City Council to deal with the question of war bonuses. The latter committee have dealt with the application, along with others from Corporation employees, and they have made the following recommendation to the next meeting of the City Council:—

Men over nineteen years to have a bonus of 3*s.* a week where the wages do not exceed £3 a week; male employees under nineteen to have 2*s.* a week; female employees 2*s.* a week all round, with the same maximum of wages.

It is stated that the tramwaymen are disappointed at the decision, and the union officials called a meeting to be held on January 30 to consider the position.

Appended are some extracts from the general manager's report:—

TRAMCAR DRIVERS AND THEIR ECONOMIC VALUE.

There are 344 car drivers at the present time. Eighty-three have been promoted to the position of driver since war broke out and have had, in consequence, an increase of wages ranging from 1*s.* 2*d.* to 2*s.* 4*d.* per week, from which certain bonus amounts have been deducted, and further, under the operation of scales their wages with good service automatically increase every six months ½*d.* per hour, or 1*s.* 2*d.* per week for 18 months. In addition to this, after three years' satisfactory service, they are entitled to 7½*d.* per hour, and after six years' satisfactory service, to 7½*d.* per hour, excluding any bonus that may belong to their particular class, plus uniform value, sickness benefit, free holidays, and free travelling to and from work.

The main point to be considered, therefore, in connection with drivers is that 344 men are receiving in wages as a minimum 32*s.* 8*d.* per week, and as a maximum 37*s.* 7½*d.* per week, including bonus, and the minimum wage men have a periodical increase in front of them (after the first twelve months' service) if their services are satisfactory.

The above statement must be considered in the light of what has already been said as to the effect of bonus anomalies Broadly speaking, it may be stated that their weekly remuneration is a steadily increasing amount (maximum wage men excluded), and that fact should be borne in mind when considering the statement of steadily increasing cost of living.

In order to arrive at a correct estimate of the economic value, or market value of a driver, it is necessary to consider (apart from enlistment and munition work) what has taken place in the Department since war broke out. In that period thirteen drivers have voluntarily severed their connection with the Department to take up other work, which means that only 3.7 per cent. of drivers have considered it worth their while to accept other positions. I submit that a fair inference of the above figures is that we are paying an economic wage to drivers, and that, whilst there is undoubtedly a shortage of suitable men, this is due to other than ordinary economic causes.

CONDUCTORS AND HANDYMEN.

There are 367 conductors; 315 of these have come into the Department since war broke out, and apart from enlistments, 98 have left voluntarily, their average service being eight months. The present position of the supply of labour for conductors is so well-known to the committee, having been dealt with thoroughly in other reports that I need hardly point out the very extraordinary position of affairs.

We are in considerable difficulty regarding handymen. To-day, the rate of pay for handymen is the same as cleaners, viz., 6*d.* per hour on appointment for 54 hours per week, and after one year of satisfactory service 6½*d.* per hour is paid. They are, it is true, recruited from the "cleaner" class, but their work is of a semi-skilled character, and, due to the fact that so many skilled men have left us, more important work is falling upon the shoulders of these men. They are of a very special type, and some reconsideration of their wage, it seems, is imperative, as their economic value has undoubtedly risen.

I notice that on the Liverpool Corporation the arrangement, as far as handymen are concerned, is that the wages of these men are increased at the discretion of the manager to a certain maximum, and I suggest for the consideration of the Committee the desirability of doing something of the same kind here. The men themselves are of such variable value that it is very awkward to fix them on any definite scale, and if the matter could be left in some such way as mentioned above, the results, I am confident, would be satisfactory. (This course was subsequently adopted.)

CLEANERS.

There are employed 130 car cleaners, the majority of whom are new men. Their starting rate is 6*d.* per hour for 54 hours per week, and after one year of satisfactory service 6½*d.* per hour is paid. These men are taken from varying classes. Whilst there have been many changes (190 have passed through since August, 1914) we are not severely troubled with shortage of applicants for cleaners, the changes being due to the fact that practically all military age men have either enlisted, or have been taken into the running department. The maximum wages, it will be noticed, are 6½*d.* per hour of 54 hours per week, which, including bonus, gives a weekly wage of 32*s.* 3*d.*, in addition to which they are entitled to the special sickness benefits under section 47 of the National Health Insurance Act. This Act costs the department about £5,000 per annum.

Mr. Spencer estimates that the total cost of granting the concession asked for would be £16,416, or, deducting the war bonus, £10,322. Including permanent way men in the city engineers' department, the aggregate cost would be £12,616. The general manager also points out that under the concession a first-class driver and a depôt inspector would receive wages that would be bound to react upon the wages and salaries received in the engineering, clerical and traffic departments. Applying the union's request to all these the extra cost would be £15,000.

PERCENTAGE OF WAGES TO EXPENDITURE AND REVENUE.

The following Table shows the percentage of cost of labour to gross revenue since 1909, from which it will be noted that in 1909 the percentage of wages to gross revenue was 33 per cent. In 1911 it dropped to 31 per cent., whereas for the year just ended it has attained the figure of 38 per cent.

Year ended March 31.	Total Working Expenses.	Total Wages.	Percent. of Wages to Expenditure.	Total Revenue.	Percent. of Wages to Revenue.	Average Fare.
	£	£	%	£	%	
1909	170,196	81,572	47	244,235	33	1.165*d.*
1910	170,699	83,419	48	259,696	32	1.167*d.*
1911	176,002	85,553	48	270,965	31	1.161*d.*
1912	180,135	92,764	51	289,335	32	1.168*d.*
1913	200,552	104,749	52	299,102	35	1.086*d.*
1914	231,152	118,059	51	317,133	37	1.058*d.*
1915	246,096	126,328	51	329,888	38	1.059*d.*

The above figures include all wages paid by the Tramways Department, including permanent way.

LOCOMOTION DURING THE RAID.

While London escaped the airships' visitation on Monday night, additional precautions were taken. Many travellers deserted the suburban railways and resorted to the cars and omnibuses. Great difficulty was experienced in ascertaining the destination of the cars. This could easily have been obviated if every motorman had made a practice of calling out his destination, thus averting the need for people to throng to the side indicators and run the risk of being injured by other vehicles.

From reports published in Thursday's newspapers it appears that in Norfolk information of the approach of the raiders was received at 4.30 in the afternoon. It was five o'clock on Tuesday morning before the last of them went. The county has suffered little damage.

The "Yorkshire Post" states that it is apparent the invaders reached the six Midland counties by following the various lines of railway. They manœuvred for four or five hours in one area about fifty miles in circumference, proceeding generally along the lines of railway, and dropping bombs. Their progress was notified in advance, and measures were taken to circumvent them. These seem to have been effective, because the raiders evidently fell into confusion at certain converging points.

Railway and tramway services were stopped. A populous town in Derbyshire was in darkness when the intruders appeared early in the evening, and thus escaped attention then, but at midnight, when the hostile aircraft reappeared, the place was again in full activity, and afforded a good mark.

In this town one bomb struck a tramcar, and the mayoress of the town was very severely wounded by a splinter from the bomb. She was not expected to recover.

Among the methods adopted for giving warning was the cutting off of the electricity supply and the reduction of gas pressure. At a meeting of Doncaster Council the Mayor pointed out that it was the salvation of cities and towns that they could be put into absolute darkness. What saved one city was the complete darkness.

TRADE OPENINGS IN RUSSIA AND INDIA.

A British Consular report on the Odessa district states that there are big openings for British trade, for manufacturers prepared to step into the shoes of the German and Austro-Hungarian trader and continue working on his conditions and terms. Russian traders buy in the market where they can get the easiest terms. At Nicolaieff the work of constructing electric tramways was continued throughout the year 1914, and two of the lines were opened towards the end of the year. There are electric tramways and lighting at Kharkoff. The Rostov-on-Don Tramways Company purchased twenty cars from Belgium in the spring of 1914, but they were found to be too heavy. Ten of the cars are laid up in the depot through accidents and cannot be repaired there. Failing Russian, correspondence should be in French.

In a review of trade in India by the Director of Statistics to the Indian Government, it is stated that all the larger towns and chief ports possess electric light and electric tramways, or are about to use power for those purposes. The collieries have largely adopted electrical equipment, and here German goods have found an opening. The Calcutta market has in late years been flooded with cheap German materials for electric wiring. Since the outbreak of hostilities this source of supply has ceased.

Digitized by Google

ABUSE OF STRIP AND MONTHLY TICKETS.

The London Electric Railway, Central London Railway, and the City and South London Railway on February 1 withdrew their strip and four-weekly season tickets. Arrangements have been made to clear up the outstanding issue. The reasons for this change are twofold. First, the shortage of staff due to the war has necessitated the reduction of ticket checking to a minimum. Secondly, these forms of tickets have proved to be easily open to abuse. The result will be a simpler ticket system. In place of these tickets a new monthly season ticket has been introduced, and for all important issues is sold direct at the booking offices without delay, just as an ordinary ticket. For check and record it is necessary to ask passengers wishing such tickets in the first instance to fill up their names and addresses on a little slip, but for all renewals of the first ticket it will be sufficient to hand in the expired ticket not later than the day after its expiry at the booking office of issue, in exchange for a new one.

The quarterly season ticket rates in the Central London area of the Metropolitan Railway, District Railway, London Electric Railway, and Central London Railway are on a low basis compared with the sum of the daily fares. For example, the rates from Hammersmith to Mansion House was 28*s.* 9*d.*, as compared with an ordinary fare of 3*d.* The usual rate for a 3*d.* fare is 32*s.* 6*d.* Commencing February 1, 1916, these low rates will be increased to the more usual level of charge and some minor adjustments made. The increases are confined to the areas between Hammersmith and Wood Lane on the west, and Aldgate and Aldgate East on the east and cover stations on the Circle, and on the Underground Railways, within the Circle. They do not therefore affect the residential suburbs. In addition the minimum price of a season ticket on the Underground Railways has been reduced from 17*s.* to 15*s.* for a quarterly ticket in respect of a penny fare. It is thought that only where season tickets are necessary for purely residential purposes is there a good case for a cheap rate.

GLASGOW'S WOMEN DRIVERS.

Since January 30 the number of women acting as drivers of the Glasgow tramcars has been increased from five to twenty-six, in accordance with the decision of the Trammays Committee to increase the thoroughness of the experiment. Reports received by the general manager from the depôts showed that the women had done their work remarkably well. In order to give them greater confidence experienced motormen were put on duty as conductors on most of the cars of which the women were in charge. The women kept their cars running well to scheduled time, and altogether they have created a favourable impression. They are not engaged upon routes specially selected to make the duties easy. Practically all the routes of the system are traversed by their cars.

Female conductors on the Birmingham cars number 697, and the Tramways Committee on January 28 reported that they are discharging their duties in a very satisfactory manner, and that the "sympathy and kind assistance extended to them by the public is highly appreciated." Eighty-five women are employed as car cleaners.

Women have made their appearance as conductors on the Croydon cars. The general manager has reported that so far their work appears to be quite satisfactory, and that more of them are being trained.

At Dover the general manager has stated that he cannot obtain men for the cars. The employment of boys as conductors does not give entire satisfaction, and it is proposed to engage females.

MELBOURNE AND SYDNEY ELECTRIFICATIONS.

An application has been made to the Victorian Legislature by the Railway Commissioners for a loan of £800,000 towards the electrification of the Melbourne Suburban Railways, excluding the construction and alteration of rolling stock.

An announcement has been made by the New South Wales Minister for Public Works, that the construction of the City Electric Railway will be begun in March. Work is being pushed on in connection with the electrification of the Sydney North Shore Railway. The Railway Department have been advised to proceed with the construction of new rolling stock, so that it may be ready for use as soon as power is available.

MISCELLANEOUS NEWS AND NOTES.

The Institution of Electrical Engineers.—At the meeting on Thursday, February 10, Mr. O. L. Record will read a paper on "The Testing of Underground Cables with Continuous Current."

New Power Station for Edinburgh.—The total cost of a new power station to be erected at Portobello by Edinburgh Corporation is estimated at £199,584. Tenders have been accepted to the amount of £93,369.

War Traffic at Dover.—Up to the present there has been an increase of nearly £2,500 in the tramway receipts at Dover. When the year ends, on March 31, it is expected that the undertaking will show a profit, the first for many years.

An Australian Extension Scheme.—A Bill has been introduced in the Victoria Legislature to authorise the construction of an extension of the Prahran-Malvern Tramways. The Tramways Trust are also seeking to increase their borrowing powers by £50,000 to £725,000.

Repairs Urgently Needed.—Lack of labour at Dover has caused delay in the removal of worn rail joints. Damage has consequently been sustained by the cars, and, at the tramway manager's request, a sub-committee has been appointed to go round with the deputy surveyor and make a list of the places needing immediate attention.

Charge for Traction Power.—Owing to the loss of revenue due to the decreased lighting and the increased cost of generation entailed by the high charge for coal, the electrical engineer at Brighton has recommended that the charge for power for the tramways service be raised from 1.35*d.* to 1.4*d.* per unit.

Croydon Tramways and Parcels Traffic.—An improved parcels delivery is greatly needed at Croydon, and the question of incorporating a service in connection with the tramways has been considered. Owing to the shortage of labour the tramways committee have, however, decided not to proceed further in the matter.

Improved Receipts at Croydon.—Alderman G. J. Allen, chairman of the Tramways Committee, has reported an increase of £5,382 in the receipts up to January 22 over those of the previous year. Unfortunately, he added, the motor omnibuses were showing increased activity.

Trouble with Trolley Boys.—The boys engaged on the Manchester cars to attend to the bell and trolley complained of wages paid to girls who have been introduced to fill vacancies. The Tramways Committee have offered them 1*s.* a week bonus and time and a quarter for overtime, and the offer has been accepted.

Difficulties at Mexborough.—Owing to breakdowns on the Mexborough and Swinton Tramways, two local authorities have threatened to complain to the Board of Trade. The Tramways Company attribute the trouble to the scarcity of mechanical and repairing materials and the shortage of labour.

Shortage of Cars at Rotherham.—Mr. E. Cross, general manager and electrical engineer, has reported to Rotherham Tramways Committee that there is a shortage of cars. No new cars have been purchased since March, 1909, when six were ordered. The cars are undoubtedly overtaxed, and complete satisfaction cannot be given under existing circumstances.

The Society of Engineers.—The ordinary meeting of this Society will be held at 5.30 p.m. on Monday, February 7, at Caxton Hall, Westminster. Mr. Norman Scorgie will present the premiums awarded for papers read before the Society during the past year, and Mr. Percy Griffith, president for the year 1916, will deliver his presidential address.

Objection to Double-Deck Cars.—Although the Board of Trade have refused to withhold their sanction to the running of double-deck cars on the Colwyn Bay section of the Llandudno and Colwyn Bay Electric Railway, the Urban Council have referred the matter to a special committee with a view to inducing the Board to hold a local inquiry.

New Routes at Birmingham and Doncaster.—Colonel Druitt, of the Board of Trade, on January 26 inspected and passed for opening the extension of the Stratford Road tramways to Acock's Green, Birmingham. The Board of Trade inspection of the extension of the Doncaster tramways to the colliery village of Brodsworth has been fixed for February 16 or 17.

No Further Curtailment of English Railway Service.—In reference to the announcement that the railway facilities in Scotland are to be curtailed owing to military requirements and the necessity of sending more goods by rail, it is stated that the proposal relates solely to the Scottish railways, and that no further reductions of the English railway services are at present contemplated.

Glasgow Tramways Battalion Complimented.—On each occasion that the Glasgow Tramways Battalion had occupied the trenches in France up to January 28, they were complimented by the Divisional and Brigade commanders on the work done while in occupation. With the aid of a pianoforte borrowed from the local curé, the men are able to hold concerts when in their rest billets.

Tramway Insulators for Holland.—An inquiry has been received by the Commercial Intelligence Branch of the Board of Trade from Holland for the supply of tramway insulators. A drawing of the article required may be inspected by manufacturers and exporters at the Commercial Intelligence Branch, 73, Basinghall Street, London, E.C.

Plymouth-Devonport Through Running.—When the permanent connections have been made between the Plymouth and Devonport tramways, the terminus for cars coming from Devonport viâ Pennycomequick will be at St. Andrew's Cross. This will avoid the congestion that might occur if the terminus was at the Theatre Royal. The Board of Trade have sanctioned the borrowing of £5,000 for the purchase of six new cars, repayable in fifteen years.

Purchase of Motor Fire Appliances.—H.M. Treasury having granted the application of the London County Council that the repayment of the whole of the expenditure in each year upon the purchase of motor fire appliances, other than fire floats, should be based on the ten years period, the Treasury asks that certain questions may be reconsidered at the time of revising the general regulations governing the period over which the Council's capital expenditure may be spread.

Restriction of Services at Leeds.—Hitherto the Leeds tramways department have increased the services in the afternoon and early evening, and taken off a number of cars between 8.30 and 11 o'clock at night. In this way the number of cars running between those hours has been reduced to about 150. Since January 31 a further fifty cars have ceased running soon after 10 p.m., the result being that between ten and eleven o'clock only two cars now run where three ran before.

The Breakdown at Wigan.—After four days' interruption, owing to a breakdown at the generating station, the Wigan tramways service was resumed on January 27. The difficulty was overcome by obtaining a supply of power from the Lancashire Electric Power Company, whose manager and staff put themselves to great exertion. The breakdown is attributed to the war having prevented the

Digitized by Google

Electricity Committee from getting their requirements met. New boilers had been on order since an early date in 1914.

The Bury Accident.—Evidence was given on February 1 by the motorman of the Bury tramcar that ran off the rails at Radcliffe on January 4, at an inquest held on a passenger who was fatally injured. He said he tried to stop the car at a request stop, but when he applied the hand brake the wheels began skidding on the greasy rails, whilst the sand box failed to act. He applied the magnetic brake, but neither this nor other means which he resorted to for stopping the car acted. A verdict of accidental death was returned.

Extensions of Time.—Halifax Tramways Committee have been informed that the Board of Trade will extend for one year from August 18, 1916, the time for the completion of the tramways authorised by the Halifax Corporation Act, 1916. The Board have also extended for one year the time limited by the Swansea Corporation Light Railways (Extension) Order, 1914, for the compulsory purchase of lands for extension of railways No. 1 and 3. An extension of two years, to February, 1918, has been allowed for the completion of Bingley Council Tramways to Crossflats.

Too Many Concessions at Leith.—The Tramways Committee have received a report from the burgh treasurer and the tramways manager advising an increase of 25 per cent in the payments to the renewals fund, in view of work required to be done in 1919 to the permanent way. The report also advises the abolition of halfpenny fares, the restriction of workpeople's tickets to the morning and evening instead of issuing them also at breakfast time and at the dinner hour. The discontinuance of the concessions to soldiers and sailors is also recommended.

Varnished Lamps or Curtained Windows?—During a discussion on the difficulties of the Coventry tramcar conductors, a member of the City Council advocated the adoption of the Birmingham method of complying with the lighting restrictions. Instead of putting the cars almost in darkness, windows were supplied with curtains, and there was a good light inside. Councillor H. W. Wale, vice-chairman of the Tramways Committee, replied that they were hoping to provide curtains, but the cost of £22 per car made the proposal prohibitive. The sum mentioned evoked exclamations, and one councillor asked if the curtains were to be of gold lace.

War Restriction on Middlesex Tramways.—As the lessees of tramways owned by Middlesex County Council, the Metropolitan Electric Tramways Company have deposited a Bill to relieve, until three years after the war, the County Council "from all liability to proceed or to be compelled to proceed" with the tramways and widenings authorised in 1911. The Bill also postpones until the same period the time granted in 1913 for erecting railless trolley vehicle equipment in Wood Green and Tottenham from Green Lanes to Ferry Lane.

"T.O.T." War Funds.—Since the start of the war a sum of £60,000 had been distributed from the mutual aid fund founded by Sir Albert Stanley, managing director of the London Traffic Group, for the relief of the dependants of employees serving in the Navy and Army. Nearly 9,000 of the men have enlisted, and their casualties number 875. The fund is subscribed to by the officers and employees of the various electric railway, tramway and omnibus companies, and there are 16,000 dependants to be provided for. In both summer and winter outings and entertainments are given to the wives and children.

Remedial Proposals at Walthamstow.—The Urban Council have been recommended by the Light Railways Committee to discontinue halfpenny fares, to increase the workmen's fares by 50 per cent., and to discontinue ordinary return tickets on the Chingford Mount route. Similar suggestions have been made by a deputation from the Property Owners' Association; but at a meeting of the Council on January 26, the committee's suggestions were referred to Mr. Murray, the general manager, to report upon, although the proposer of this course admitted that the manager advocated the abolition of the halfpenny fare.

Tramcar Workshops and the Munitions Act.—Judging by a case decided at Birmingham Munitions Court on January 27, there is delay in bringing into force the clause of the Munitions Act that affects skilled workers in tramway depôts. A turner who applied for a discharge certificate stated that he was employed at one of the tramway depôts. From 6 a.m. to 5 p.m. he was engaged in car repairing work, but from 5.35 p.m. to 9.30 p.m. he worked upon war work. He wanted to improve his position. The chairman ruled that the applicant had not been substantially employed on munitions, and therefore the certificate would be granted.

Traction Lamps and Varnish.—A useful pamphlet has been issued by the General Electric Company, Ltd., giving the prices and illustrations of the Robertson carbon filament lamps, which are made throughout of British labour at Hammersmith and Lemington-on-Tyne. The standard lamps give 800 hours' useful life, and other efficiencies can be supplied to suit customers' requirements. Those required for series running should be specially ordered. A long series of experiments enables the company to recommend their tramcar lamps for all classes of traction work; and these are supplied in white or coloured glass. Varnish and frosting fluid can be supplied in any quantities.

Employees' Remuneration.—The temporary war grant to certain members of the staff of the London County Council Tramways (to whom the Conciliation Board's scheme does not apply) in order to meet the increased cost of living is estimated to amount to £3,700 for the year 1915-16. Aberdeen Tramways Committee recommend that motormen be paid at the rate of 5½*d.* per hour instead of 5*d.* as previously, owing to scarcity of labour, and as an inducement to the men to remain in the service. At a conference of delegates representing South Wales and Monmouthshire tramway employees, it was decided to make application for advances in wages. Mr. N. Bradwell, of Sheffield, president of the Tramway and Vehicle Workers' Union, and Mr. S. Hurst, assistant general secretary, made the speeches that led to the decision referred to.

Inquiry into Licensing of London Drivers.—The Home Secretary has appointed a committee to consider and report whether having regard to the normal conditions of traffic in the metropolis, licences to drive motor-cabs, motor omnibuses, or tramway cars should be granted to men who suffer from some partial physical disability by loss of a limb or other similar cause, and if so, within what limitations. The following are the members of the committee: Mr. F. L. D. Elliott, Assistant Commissioner of Police (Chairman); Mr. C. W. Bowerman, M.P.; Major A. Tudor Craig, Secretary Soldiers' and Sailors' Help Society; Sir Frederick Eve, Vice-President Royal College of Surgeons; Mr. J. W. Orde, Secretary Royal Automobile Club; Mr. R. J. Simpson, Local Government Board; and Sir Albert Stanley, Managing Director London General Omnibus Company. The Secretary to the Committee is Mr. H. A. Tripp. Communications should be directed to him at the Metropolitan Police Office, New Scotland Yard, S.W.

PERSONAL.

Lord Montagu of Beaulieu has been elected an associate of the Institution of Mechanical Engineers.

Mr. T. C. Winfield, works superintendent, West Ham Corporation Tramways, on the recommendation of the Tramways Committee, has been granted an increase in salary from £250 to £275.

Mr. G. Schofield, formerly constructional superintendent to West Ham Council, has been appointed chief assistant engineer to the Nairobi Power and Lighting Company, East Africa.

Mr. C. W. Salt, borough electrical engineer of Torquay, who recently enlisted in the London Territorial Electrical Engineer Corps, has been promoted corporal.

Mr. H. H. A. Curtis, of Lake Coleridge, New Zealand, has been appointed power station superintendent in the Tasmanian Government Hydro-electric Department.

Mr. Eric Smith, electrical engineer to the Santa Fé Railway, has returned to England and joined the signal company of the Canadian Contingent.

Mr. E. J. Redmond has presented a report to Maryborough (Queensland) Tramways Committee on the question of electric light and tramways. The committee have authorised additional expenditure in order to complete the information.

Motorman C. S. Farmer and Conductor C. H. Morgan, of the Birmingham Corporation Tramways, have been awarded the Distinguished Conduct Medal for gallantry at the front. Morgan has since been killed in action.

Alderman J. Hill, who was returned unopposed as M.P. for Central Bradford, has disbursed 1,000 guineas among the charitable organisations of the city, that sum representing the average election expenses of a candidate for Parliamentary honours.

Sergeant-Major D. Harrop, who, until the war, was electrical engineer in the testing room at the Hyde Road depôt of Manchester Corporation tramways, has been promoted second-lieutenant in the 12th Loyal North Lancashire Regiment, in recognition of zeal, devotion to duty, and bravery in the field.

Inspector Lee, Colchester Corporation Tramways, has been home on furlough from the Royal Army Medical Corps in France, after a year's service. As reported in our issue dated December 9, he was awarded the French Military Medal for distinguished conduct. It was fastened to his tunic by General Haigh, now the British Commander-in-Chief on the western front.

Dublin United Tramways Staff.—In their annual report the directors of Dublin United Tramways Company state that "it is with deep regret that they have to place on record the deaths of Mr. R. S. Tresilian (secretary), Mr. C. W. Gordon (manager), and Captain C. C. Vesey (one of their colleagues on the board). Mr. G. M. Harriss, electrical engineer, has been appointed general manager; Mr. W. McHugh, previously chief accountant, secretary, and Mr. D. Brophy, Mr. Gordon's chief assistant, traffic manager. The Right Hon. L. A. Waldron, P.C., has been appointed a director."

CONTRACTS AND ORDERS.

West Bromwich Council have received a recommendation from the Electricity Committee to accept the tender of the New Conveyor Company for an extension of the coal conveyor.

C. Mackintosh & Co., Ltd., have obtained a contract for mackintoshes and waterproofs for various departments of the Liverpool Corporation.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

Now Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

MEMBER INSTITUTION OF MECHANICAL ENGINEERS;
MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND;
MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS;
MEMBER MUNICIPAL TRAMWAYS ASSOCIATION;
FELLOW PERMANENT WAY INSTITUTION.

FURTHER PRESS OPINIONS:

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

"The excellent book entitled 'Tramway Track Construction and Maintenance,' by Mr. R. B. Holt, is profusely and artistically illustrated. It ought to be a very useful book for engineers engaged on tramways."—*Railways* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE NVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON W.C.

J. Hunter & Sons, Ltd., have received a contract for the supply of overcoats for female tramway conductors at Liverpool.

Salford Electricity Committee have placed a contract with A. Knowles & Sons, Ltd., Pendlebury, for 500 tons of Agecroft dry slack, 15*s*. per ton, exclusive of the cost of labour to load the coal into barges on the canal, averaging 7*d*. per ton, and canal dues and hire of boats, amounting to 8*d*. per ton.

FINANCIAL REPORTS AND MEETINGS.

City of Buenos Ayres Tramways Company.—The directors announce a final dividend of 1*s*. 3*d*. per share (making 5 per cent. for the year) adding £4,200 to the amortization fund, and carrying forward £141.

The British Empire Trust Company, Limited, announce that they have received cable advice that a dividend of 2 per cent. has been declared on the capital stock of the Winnipeg Electric Railway Company, for the quarter ended Dec. 31, 1915.

Traction and Power Securities Company.—For the past year the board recommend a dividend of 4*s*. 6*d*. per share, free of income tax on the ordinary shares. A profit of £561 from sales of investments has been placed to reserve, and £8,579 carried forward.

Tyneside Tramways and Tramroads Company.—On the past half-year's trading there is a divisible balance of £6,435, and a dividend of 3 per cent. is proposed, adding £2,188 to reserve for the conversion of consols into war loan, and carrying forward £625.

Dublin United Tramways Company.—The accounts for 1915 show a divisible balance of £95,845. A final dividend at the rate of 5 per cent. per annum is proposed on ordinary shares, making 5 per cent. for the year, setting aside £18,000 for renewal of rails, adding £5,000 to the reserve, and carrying forward £13,045.

Scarborough (South Cliff) Tramways.—At the annual meeting of this company, on January 29, Alderman J. Pirie (chairman) stated that the income from tolls had decreased from £1,032 in 1914 to £369 in the past year. They had written down their consols to the market price, and the net surplus was £86. It was decided to add £23 to the sinking fund, and carry forward the remaining £63.

Devonport Tramways Company.—Mr. C. S. Hilton, presiding at the annual meeting on January 26, said the balance up to the handing of the undertaking over to Plymouth Corporation on October 2 last was £10,679, which the directors recommended should be distributed among the shareholders. The company had powers to go into liquidation, and would do so when advised.

Claim for Interest on Recent Capital Outlay.—The Metropolitan Railway report for 1914 states that under the terms of the arrangement for Government control of railways during the war, no benefit at present accrues to the company from the earnings of new lines and works brought into use since 1913, although they have to bear the interest on the capital raised for their construction. Representations have been made to the Government on this point, and it is confidently expected that their claim will be recognised.

Blackpool and Fleetwood Tramroad Company.—The annual report for 1915 shows a net profit of £18,131, after providing for debenture interest, and £2,977 was brought forward. A final dividend of 4½ per cent. is proposed, making 6½ per cent. for the twelve months (as against a similar amount the previous year and 8½ per cent. in 1913), adding £615 to the depreciation reserve and £5,499 to the general reserve, writing £995 off investments, and carrying forward £4,250.

Liverpool's Grant to the Rates.—The Tramways and Electric Power and Lighting Committee have set aside for the relief of rates £100,000 from tramway profits for 1915 and £50,000 from electricity undertaking, the latter sum being £25,000 more than in 1914. The tramway grant is the same as in 1914. The estimated tramway expenditure for the current year is £629,924, as compared with £619,908 last year. The income for last year was £726,095, an increase of £3,770 over 1914. On reserve renewal and depreciation account the expenditure is estimated at £61,000.

Newcastle's Estimated Surplus.—The Tramways Committee estimate that the income of the tramways for the ensuing year will be £319,400, of which £310,000 was traffic receipts, as compared with an estimated income for the present year of £282,200, including £270,980 traffic receipts. As against this estimate, it is now expected that by the end of the municipal year the receipts will reach £315,000, and the total income £324,400. The estimated expenditure is £196,300. The expenditure for the present year was estimated at £160,300, but it will probably amount to £196,175, which will leave a probable gross surplus of £128,225. The net surplus is put at £35,060. From the latter figure there has to be deducted £9,600, representing allowances to men on active service. It is estimated that there will be an expenditure of £19,277 out of the reserve and renewals fund, as compared with an estimated expenditure this year of £34,000, but which will probably be £24,368.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended January 22, the latest period for which full returns are available, give total receipts of £178,177, or £21,794 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £77 14*s*. 9*d*. per mile of single track, and last year at the rate of £69 0*s*. 3*d*., thus showing an increase for the week of £8 14*s*. 6*d*. per mile open. As will be seen from our tables of traffic returns, all but two of the undertakings included show increases for the week.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev	Last	Name.	Paid.	Price, July 27 1914	Cash. Feb. 3	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	63¼	63¼
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	81/3	83/9
4%	4%	Do. 4% Deb. ...	100	91	71¾	71
4½%	4½%	Do. 4½% Deb. ...	100	98½	75	77½
5%	5%	Do. 5% Deb. ...	100	96	80	80
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	19/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94¾	94¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10 1/16xd	10 1/16xd
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98	98
$4	$4	Brazilian Trac. & Power Ord. ...	$100	66	51xd	52xd
$1½	$1½	Do. 6% Cum. Pref.	$100	97	89	90
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 9/16	6 9/16
2/6	2/6	Do. 5% Cum. Pref. ...	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	90¾	90¾
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	40	40
5%	5%	Do. 5% Cum. Pref.	100	103	57½	57½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85¾	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64¾	64¼
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75	75
70/-	70/-*	Do. 7% Pref.	100	55½	47	47¾
—	—	Do. 6% Pref. Ord.	100	17½	15	15
—	—	Do. Def. Ord.	100	11	10¾	10
5%	5%	Do. 5% Deb.	100	92	82½	82¾
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87	87
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6	6 1/16
1/3	1/3	City of B.A. Trams.	5	5½	91/6	92/
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	84	84
6/-	6/-	Dublin United Trys 6% Pref.	10	—	£11	£11
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	77½	77½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	3/8	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10⅛	9/15/6	9/15/6
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	86½
9¾d.	9¾d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	13/32	2/-	2/-
6d.	6d.	Do. 5% Pref.	1	9/16	9/-	9/3
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	58½	56½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	90½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	83¾	84½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 7/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	62	62
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	74¾	74¾
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	82½	82½
$1¾	$1¾	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	45	45
6%	6%	Do. 6% Mt. Bds.	100	76	39½	39½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94½xd	94¾
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½	94½
1/2*	1/2¾*	National Steam Car	1	15/32	12/-	12/-
9¾d.*	9¾d.*	New General Traction	1	7/8	7/9	7/9
1/2⅝	6d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¾	67/6	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84xd	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	10/32	10/1½	10/-
8d.	10d.	Provincial Trams. Ord.	1	5/8	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	88	87¾
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75½	74
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	87½	87½
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/7½
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½xd	—
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77½	77½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	8/8	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅞	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	1915-16	Aggregate. Wks.	1915-16	Increase or Dec.
Anglo-Argentine	Jan. 28	£48,728	£47,476	4	£196,071	— £6,691
Auckland.....(28 days)	Dec. 17	20,414	1,804	24	125,840	+ 908
Ballarat and Bendigo ...	Nov. 7	3 835	3,586	32	25,097	— 2,670
Brazilian Traction Mlrs.	Dec.	6,010,490	6,527,000	52	77,113,110	+3,761,632
Brisbane	Dec.	30,890	33,960	52	372,034	+ 23,923
British Columbia.....$	Nov.	648,485	562,782	22	2,636,479	— 688,357
Buenos Aires Lacroze ...	Dec. 6	44,000	43,528	26	250,930	— 1,836
Burmah Tramway ... Rs.	Jan. 29	3,686	3,327	...	92,343	+ 6,804
Calcutta.....Rs.	,, 29	62,912	65,343	4	284,369	+ 17,535
Cape Town	Dec.	...	16,589	...	...	...
Carthagena & Herrerias..	Jan.	904	2,841	4	2,841	+ 1,937
Cordoba	Dec.	12,091	13,025	34	124,148	+ 4,718
East India	Jan.	1,914	2,015	26	12,531	+ 650
Hong Kong .....$	Jan. 1	10,261	11,063	4	11 063	+ 802
Kalgoorlie	Nov.	2,414	2,611	48	30,402	+ 1,483
La Plata	Dec.	4,452	4,564	52	51,400	— 3,984
Lima	Dec.	32,411	34,685	52	385,854	— 7,338
Lisbon .....Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks).....Rs.	Jan. 31	28,951	32,126	2	66,383	+ 8,997
Manila .....$	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Sept.	...	61,211	...	...	...
Mexico .....$	*	...	...	...	...	...
Montevideo	Dec	28,605	31,305	8	59,712	+ 4,026
Port Elizabeth	Dec.	...	4,360	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Jan.	4,689	4 763	4	4 763	+ 74
Shanghai .....$	Dec. 29	23,595	27,393	...	...	...
Singapore .....$	Dec. 25	9,270	11,309	...	592,612	+ 17,663
Toronto.....$	Nov.	824,634	851,113	48	8,793,719	— 502,658
Winnipeg	Nov.	330,398	323,025	48	3,122,620	— 610,281

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1914-15	1915-16	Incr. or Dec.	Aggregate. Wks.	1915-16	Incr. or Dec.
Aberdeen Corporation...	Jan. 26	£1,485	£1,662	+ £177	34	£61,940	+ £40,133
Accrington Corp.....	Dec. 29	555	617	+ 62	39	21,750	+ 607
Ayr Corporation	Jan. 29	208	256	+ 48	37	14,120	+ 930
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	,, 30	1,137	1,407	+ 270	43½	60 322	+ 5,363
Birmingham Corp.	,, 29	11,970	15 616	+ 3,646	44	629,379	+ 95,660
Blackburn Corp.	,, 26	1,013	1,093	+ 80	43⅞	55,286	— 45
Blackpool & Fleetwood.	,, 29	263	294	+ 31	4	1,356	+ 111
Blackpool Corp.	,, 27	546	673	+ 127	44	72,098	+ 2,379
Bolton Corporation.....	,, 30	2 438	2,617	+ 179	44	117,980	— 615
Bournemouth Corp.....	Feb. 2	1,609	1,876	+ 267	44	93,417	+ 5,046
Bradford Corporation ...	Jan. 29	5,554	6,261	+ 707	43	282,274	+ 11,964
Brighton Corporation ...	,, 30	744	913	+ 169	43½	48,523	+ 859
Bristol	,, 28	7 789	9,366	+ 1,577	4	37,855	+ 3,905
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 29	1,376	1,608	+ 232	44	70,395	+ 2 540
Burton-on-Trent Corp...	,, 30	259	264	+ 5	44	12,525	— 296
Bury Corporation.....	,, 30	1,109	1,267	+ 158	44½	59,066	+ 282
Cardiff Corporation.....	,, 22	2,393	2,737	+ 344	42	115,305	— 1,428
Chatham & District.....	,, 27	859	1,136	+ 277	4	4,169	+ 425
Chesterfield Corp.	,, 27	234	272	+ 38	43	11,712	+ 111
Colne Corporation	,, 8	220	246	+ 26	...	...	...
Cork Electric	,, 27	407	446	+ 39	4	1,792	+ 78
Croydon Corporation ...	,, 21	1,431	1,665	+ 234	42	77,738	+ 4,966
Derby Corporation	,, 22	901	1,060	+ 159	42¾	44,931	+ 1,875
Dover Corporation	,, 29	226	275	+ 49	43	13,479	+ 2,286
Dublin & Lucan	,, 28	107	118	+ 11	4	458	— 5
Dublin United	,, 28	5,188	5,919	+ 731	4	24,149	+ 1,840
Dundee City	,, 26	1,158	1,281	+ 123	36½	50,105	+ 2,891
East Ham Corporation	,, 29	1,115	1 271	+ 156	43½	56,846	+ 5,882
Exeter Corporation.....	,, 28	272	325	+ 53	43	16,330	+ 925
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	,, 29	19,606	22,297	+ 2,691	35	759,192	+ 54,410
Glasgow Subway.....	,, 29	1,089	1,257	+ 168	4	5,167	+ 595
Glossop (U. Elec. Supp.)	,, 29	101	132	+ 31	5	675	+ 141
Halifax Corporation.....	,, 25	1,884	1,959	+ 75	42⅞	95,227	+ 887
Hastings & District.....	,, 28	598	756	+ 158	4	3,055	+ 263
Huddersfield Corp.	,, 29	2,179	2,666	+ 487	43	116,372	+ 15,828
Hull Corporation	,, 29	2,947	3,191	+ 244	43	134,746	— 1,247
Ilford U.D.C.	,, 29	539	614	+ 75	43	28,228	+ 3,210
Ilkeston Corporation ...	Feb. 2	109	147	+ 38	44	5,936	+ 332
Ipswich Corporation	Jan. 29	237	474	+ 237	42	23,747	+ 4,039
Isle of Thanet	,, 29	216	254	+ 38	17	4 471	— 943
Kilmarnock Corp.	,, 29	140	160	+ 20	37	6,261	+ 246
Lanarkshire	,, 27	1,659	2,049	+ 390	4	8,641	+ 1,240
Lancashire United	,, 26	1,445	1,633	+ 188	4	6,199	+ 452
Leeds City.....	,, 29	7,710	9,035	+ 1,325	44	391,404	+ 31,227
Leicester Corporation ...	,, 29	2,765	3,197	+ 432	4	13,520	+ 1,838
Leith Corporation	,, 29	633	774	+ 141	37	28,603	+ 2,212
Leyton U.D.C.....	,, 27	1,328	1,471	+ 43	43	69,610	+ 9,389
Liverpool Corporation...	,, 29	11,896	13,375	+ 1,479	4½	57,183	+ 5,276
Llandudno & Colwyn B.	,, 28	162	198	+ 36	8½	1,575	+ 116
London County Council	,, 12	46,191	45,945	— 246	41	1,817,620	— 3,624
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	,, 29	138	125	— 13	16½	2,245	— 749
Maidstone Corporation..	,, 27	139	181	+ 42	43	9,432	+ 433
Manchester Corp.....	,, 29	16,015	17,745	+ 1,730	43	778,294	+ 28,221
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation.....	,, 22	145	201	+ 56	42½	8,323	+ 481
N'castle-on-Tyne Corp.	,, 22	5,584	5,868	+ 284	43	264,800	+ 27,953
Newport (Mon.) Corp....	,, 29	693	845	+ 152	44	36,883	+ 1,452
New St. Helens & Dist.	,, 26	786	906	+ 120	30	31,074	+ 3,213
Northampton Corp.....	,, 28	531	695	+ 164	43¾	31,510	+ 5,520
Nottingham Corp.....	,, 27	3,230	3,740	+ 510	43	161,618	+ 12,569
Oldham Corporation ...	,, 30	1,937	2,318	+ 381	45	102,252	+ 5,191
Portsmouth Corp.....	,, 29	1,997	2,133	+ 136	44	108,120	...
Preston Corporation.....	,, 26	822	1,000	+ 178	43	42,173	+ 2,336
Provincial	,, 29	1,791	2,061	+ 270	17½	35,819	+ 2,713
Reading Corporation.....	,, 27	623	751	+ 128	43½	34,388	+ 3,747
Rhondda Tramways.....	,, 20	1,110	1,198	+ 88	3	3,383	+ 228
Rochdale Corporation...	,, 29	1,403	1,700	+ 297	41½	74,295	+ 3,881
Rotherham Corp.....	Feb. 2	935	1,224	+ 289	44	52,190	+ 7,039
Salford Corporation.....	Jan. 31	4,479	5,181	+ 702	43⅞	227,872	+ 10,476
Sheffield Corporation....	,, 30	7,803	9,712	+ 1,909	44¾	402,497	+ 56,423
Southampton Corp.....	,, 26	1,167	1,459	+ 292	43	65,070	+ 7,667
Southend-on-Sea Corp...	,, 26	551	601	+ 50	43	35 037	— 7,933
South Met. Trys.....	*	...	...	...	...	...	...
South Shields Corp.....	,, 22	659	732	+ 73	42¾	33,867	+ 1,509
Sunderland Corp.....	,, 30	1,245	1,525	+ 280	44	66,123	+ 1,850
Sunderland District...	,, 26	526	603	+ 77	13	7,398	+ 655
Swindon Corporation ...	,, 19	162	184	+ 22	42	8,361	+ 766
Torquay Tramways.....	,, 20	377	408	+ 31	3	1,260	+ 93
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	,, 26	485	509	+ 24	4	1,871	— 34
Wallasey Corporation ...	,, 29	988	1,132	+ 144	43¾	55,579	+ 1,290
Walsall Corporation.....	,, 29	637	834	+ 197	5	3,434	+ 572
Walthamstow U.D.C....	,, 8	723	789	+ 66	41	36,558	+ 3,553
Warrington Corp.....	,, 20	421	486	+ 65	42	19,586	+ 1,159
West Ham Corporation	,, 27	2,482	3,009	+ 527	43½	133 918	+ 11,612
Wigan Corporation	,, 27	1,296	434	— 826	43	65,670	+ 2,542
Wolverhampton Corp....	Feb. 2	1,002	1,097	+ 95	44	49,754	+ 3,162
Yorkshire (W. Riding)...	Jan. 30	1,337	1,641	+ 304	5	8,254	+ 1,216

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

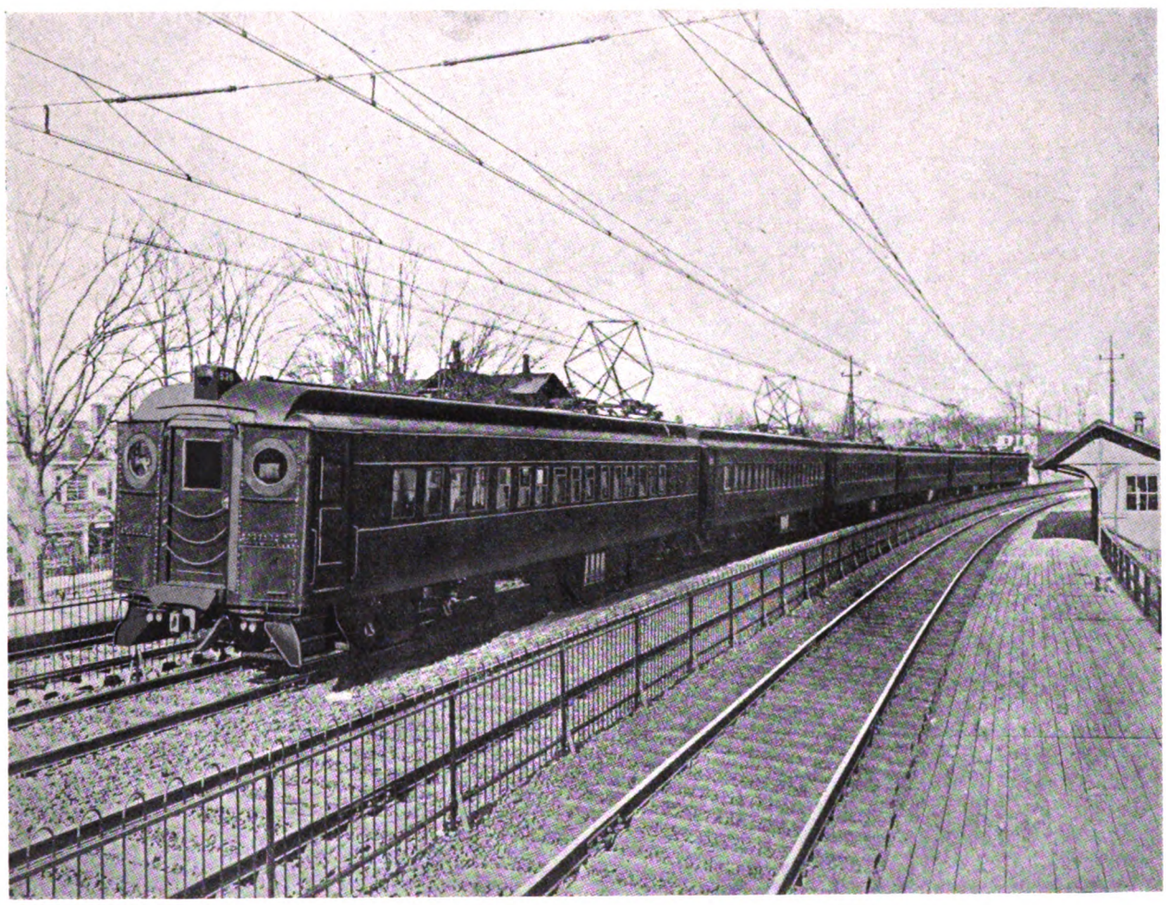
THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, FEBRUARY 10, 1916. VOL. XXXIX.

ELECTRIFICATION OF THE PENNSYLVANIA RAILWAY AT PHILADELPHIA.

SINGLE-PHASE HIGH TENSION TRACTION ON SUBURBAN LINES.

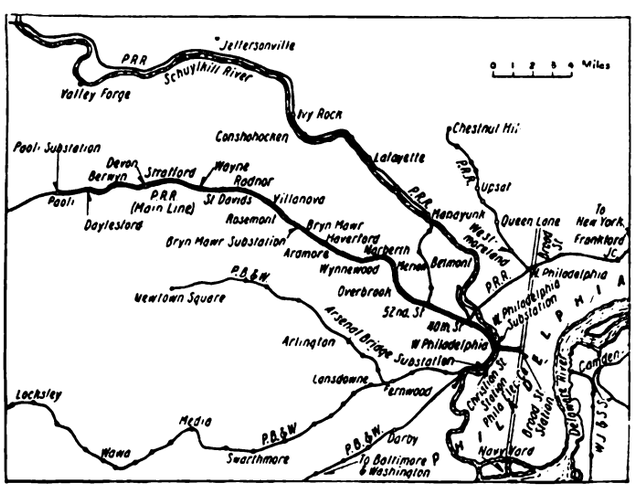
The same considerations that led to the electrification of the suburban lines of the London, Brighton and South Coast Railway and the London and South Western Railway have led the Pennsylvania Railroad to electrify twenty miles of lines from the Broad Street Station at Philadelphia. This is a terminal station, having sixteen roads approached by six main lines and three branch tracks on an elevated structure which crosses the Schuylkill river at West Philadelphia, where the routes to New York diverge toward the north, to Washington towards the south, and to Pittsburgh toward the west. Besides the through traffic routes, there are six different suburban services. The full capacity of the station under the conditions of steam operation had been reached, and any plans for its enlargement would have involved expensive and tedious reconstruction. Thorough investigation brought convincing evidence that recourse to electrification would afford the necessary relief in the most economical way. Careful estimates indicated that if the Broad Street-Paoli section alone were equipped for electric traction, it would be equivalent to enlarging the station by nearly 20 per cent. of the service on that route, and on the station as a whole it would have the effect of reducing the total number of trains by 8 per cent. A similar increase in capacity would result from the electrification of other suburban routes. In consequence of these facts the Broad



Train of Multiple Unit All-Steel Cars on the Pennsylvania Railroad.

Digitized by Google

Street-Paoli section has now been electrified, and the equipment of the Chestnut Hill branch, 12 miles in length, has been commenced. It has been estimated that with the new equipment the saving in working costs will pay the interest charges on the additional investment which, in this case, will include the most expensive portion of the work, inasmuch as the Broad Street terminus, with complicated yard and approaches, forms part of the construction required for a relatively small amount of train service. In addition there are the well-known advantages of electrification, including the higher speed of trains, greater punctuality, and pleasanter conditions of travel. The question of a selection of the system best suited to the conditions received very careful consideration; and eventually the high tension, single-phase system was adopted with overhead trolley wires and the elimination of moving machinery in sub-stations. Great importance was attached to the possibility of long-distance operation over the whole division in the future, the immediate requirements for the present suburban service taking a secondary place in the decision. Consequently we have, in this case, 25 cycle, 11,000-volt single-phase power supplied from an overhead trolley system, an arrangement similar to that of the London, Brighton and South Coast installation. Detailed accounts of the work



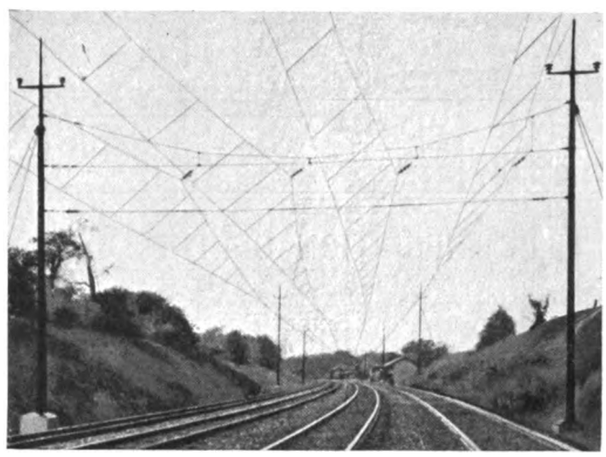
Pennsylvania Electrification near Philadelphia.

Denotes lines electrically equipped.

now completed have been supplied by the engineers and contractors, and have recently been published in America. From these sources the following brief description has been compiled.

The section at present equipped consists of 22 route miles, or a total of about 93 miles of track, including repair yards, etc. The railway company has not constructed its own station, but purchases power from a supply company whose main station is about a mile south of the West Philadelphia station. Thence the energy is delivered at 13,200 volts, through four 350,000 circular mils. three-conductor submarine cables, to the railway company's sub-station. Here it is stepped up to 44,000 volts, and is then transmitted to the step-down sub-stations. Two of the four single-phase transmission lines are continued beyond the West Philadelphia sub-station to Bryn Mawr and Paoli sub-stations. The other two cables at present terminate at West Philadelphia sub-station, but they will later be carried on to Chestnut Hill sub-station. The transmission lines of No. 00 seven-strand hard-drawn copper wires, protected by $\frac{3}{8}$ in. steel grounded wire at the top of the poles, are carried on catenary supporting structures on both sides of the track in the usual way.

The Arsenal sub-station is equipped with three 5,000 K.V.A. step-up transformers, and the West Philadelphia, Bryn Mawr and Paoli sub-stations have each two 2,000 K.V.A. step-down transformers. In all the sub-stations the transformers are of the 25 cycle



Typical Catenary Construction on Curve.

single-phase, oil-insulated, water-cooled type. They are equipped with thermostats which operate an alarm bell in case of high temperature. All the 44,000 volt circuits are connected through the bus-bars in the various sub-stations to oil circuit breakers. Open bus-bars mounted on insulators carried on pipe framework are used throughout. Telephones are provided in all sub-stations, and the signal towers controlling them, so that the power director is in touch with all the sub-stations and power men.

The tubular cross-catenary type of overhead construction is used, the cross wire bridges being placed about 300 ft. apart on the straight and closer on curves. Every mile or two the overhead construction is anchored to heavy structural signal bridges.

The catenary system over each of the four main tracks is separated electrically from those over the other tracks, and trolley sectionalising points with switches are provided at all crossovers, so that sections

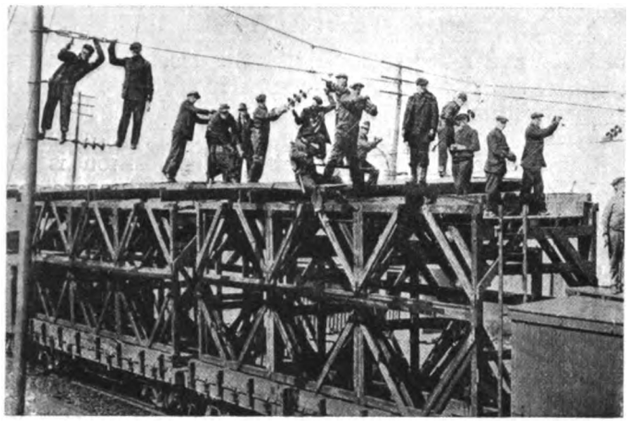
A Trio of the Erecting Gang at Work.

of the line may be temporarily cut out of service for repairs. On the main running tracks sectionalising is of the "air-break" type. At crossovers and in yards, the trolley wires are sectionalised by means of wood stick insulators, having runners or gliders on each side so arranged that, while the pantograph always

Digitized by Google

makes contact with at least one of the runners, they are separated electrically.

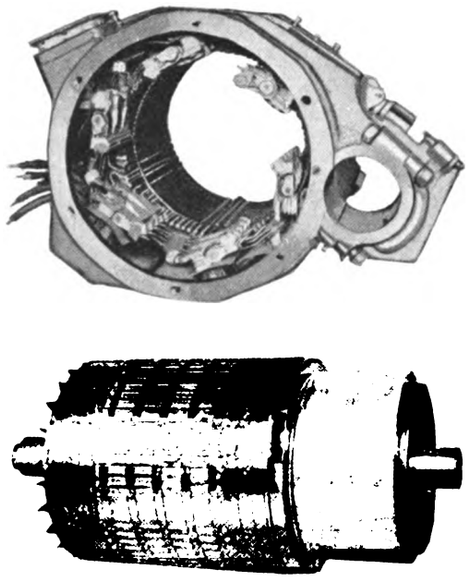
An accompanying illustration shows the manner in which the erection of this catenary work was carried out. Cars were used, the top platforms of which could be raised or lowered readily by means of chain hoists. These cars were also equipped with removable outriggers, so that in the four-track section the work



Erection of Catenary Line from Platforms Erected on Railway Wagons.

could be erected completely over one of a pair of tracks without in any way interfering with the regular steam traffic on that track.

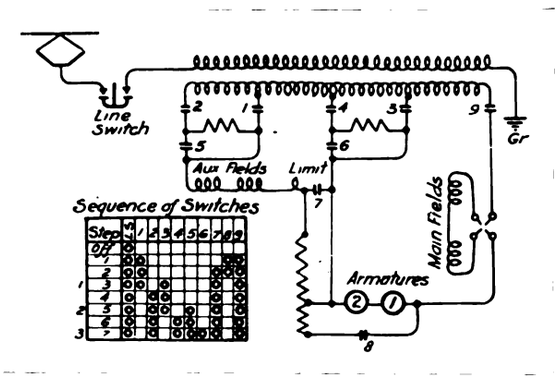
In order to minimise the inductive effect of the traction currents on adjacent telephone and telegraph wires, special series transformers are located about a mile apart. These transformers are mounted on the signal bridges, and the current in each of the trolleys is led through a primary coil of the transformer, thus inducing an equal current in the secondary coil, the ratio of the transformers being approximately unity.



Armature and Rotor of Repulsion Motor.

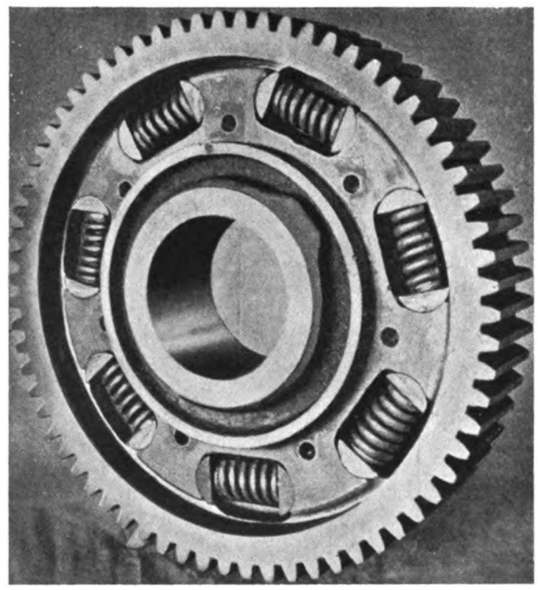
The secondary coils of these transformers are connected across insulated joints in the track, and consequently, as all trolley current must flow through the primary coil, the secondary coil insures that all the returning traction current, at this particular point of the circuit at least, must flow through the rails. In this manner the traction current is prevented from taking earth returns in parallel with the track.

An interesting feature of the electrification is that the standard suburban steel coaches of the type used in the regular steam service have been used for the electric service without structural changes. This was made possible by the fact that the requirements for mounting electric apparatus on the cars had been thoroughly considered at the time when the steel car was introduced on the railroad. There are 93 of these standard all-steel cars in the service, and they are all



Schematic Diagram of Connections of Doubly-Fed Motor.

motor cars, as no trailers will be used. The equipment of each car consists of two 225 H.P. single-phase, air blast-cooled, battery controlled equipments mounted on one truck, with automatic acceleration, and automatic multiple unit electric air brake equipment. All of the main pieces of the electrical apparatus are mounted on one end of the car, while the air brake equipment is mounted at the other end. This gives an uneven weight distribution on the two trucks, with approximately 60 per cent. of the car weight on the driving wheels.



Type of 55-Tooth Flexible Gear with Cover Plate Removed.

Each car is equipped complete with two Westinghouse motors, having a 24-tooth pinion and 55-tooth flexible gear ; and each has an hourly rating of 225 H.P., and a continuous rating of 200 H.P. when ventilated with 1,200 cubic feet of air per minute. The flexible gear is made up of a rim, on which the teeth are cut, a centre, a cover-plate, and spring details. The rim

Digitized by Google

is spring mounted on the centre, the periphery of the centre and the cover-plate acting as the bearing surfaces for the rim.

The motors, which are connected in series, are started and operated up to approximately 15 miles per hour as repulsion motors, with the auxiliary or compensating field, the armature, and the main field in series. With these series connections, the armature is short-circuited through resistance. Resistance is also inserted in series with the motors on the first step and is cut out on the second step. The third step changes the connections to energise the auxiliary field from one portion of the transformer and the armature and main field, connected in series, from another portion of the transformer, thus affording doubly fed connections. The armature short-circuit is removed when operating as doubly fed motors. Subsequent steps are obtained by increasing the motor voltages.

The master controller drum is energised from the motor generator set, in parallel with the battery, through a control plug, and moving the master controller handle to the right or to the left energises the proper control circuit for forward or for reverse movement of the train. The closing of the unit switches is governed by a current limit switch. Ten control wires between cars are necessary to operate cars in trains with one of these wires performing the dual function of the third operating wire, and the "trolley unlock" wire.

The pantograph is of especially light construction. The springs which raise it are designed to give flexibility to the framework, so that in operation a slight dragging of the trolley takes place, resulting in its following the wire much closer than with a rigid framework. The trolley is lowered and unlocked by air at 70 lb. pressure. A small hand pump is provided for unlocking the trolley when no air pressure is available. The "safety first" principle has been carried out in the provision of a grounding device of novel design. Steps for mounting to the roof are provided at one corner of the car only, and a lever is placed on the roof at this corner. When one climbs to the top of the car, this lever is thrown up, thus locking the trolley in the down position and grounding the entire framework.

The line switch is air-operated, and is closed by energising a control circuit from the master controller plug. The car transformer is of the 2-circuit air-blast type, and is suspended from the centre sill of the car as close to the motor truck as possible. Ventilating air is taken in at the low-tension end, and is discharged at the high-tension end through especially-constructed hoods which cover the air outlets to prevent the entrance of rain and wheel wash.

Nine electro-pneumatic operated switches of standard construction are mounted in one group. The master controllers are of the single-handle type. Nine controller positions are provided; an emergency or "dead man's" position in the centre, and an "off," first, second, and third running positions, for both forward and reverse movements. The controller drum is spring returned, and, if released, will return to the middle or emergency position. In this position the control is cut off and a valve magnet is energised which releases air from and operates a brake pipe relay, thus applying the emergency brake. Each controller also has two push button switches for unlocking or lowering the trolley. Control energy is obtained from a motor generator operating in parallel with a battery.

The fan for ventilating the transformer and motor is a 21 in. single inlet Sirocco wheel, and is mounted on the shaft of the motor which drives the compressor. The motor drives the fan continuously, and the pinion driving the compressor is connected to the motor by a disc clutch. The motor is of the doubly fed type, and operates at approximately 980 revolutions per minute, at normal voltage, with the continual loads of the fan and compressor, while the speed with the fan alone approaches 1,300 revolutions per minute.

A line or voltage relay is provided for cutting the direct-current control generator from the battery, and also to operate two small emergency lights and headlights in case the traction power should fail.

The motorman's brake valve contains both electric contacts and pneumatic parts, the electric portions being mounted above the pneumatic portions. There are six positions:—(1) The release and running, (2) the electric holding, (3) the handle off, (4) lap, (5) service, and (6) emergency. The first-named position is to the left, and in this position all train brakes are released and the system charged. The "electric holding" position, as the name implies, holds the train brakes through the electric control system but recharges the system. Pneumatically, this position is identical with the release and running position. All ports are closed in the "handle off" position, and the handle may be removed; in the "lap" position, the ports are also closed. The "service" and "emergency" positions are for applying the brakes for service or emergency application. In making a service application, a limiting valve in conjunction with the brake valve allows a maximum reduction of 20 lb. in the brake pipe. A small cut-out plug is provided for cutting out the electric operation when desirable.

The main reservoir pressure carried is 100 lb., and the brake pipe pressure is 70 lb. To permit the operation of these equipments in steam service, where the brake pipe pressure is 110 lb., without making adjustment, a main reservoir bypass and limiting valve is employed. By its use the same cylinder pressure is secured in making an emergency application in either steam or electric service, although the operation of the universal valve is the same for either. In steam operation, the pipe line, which is used as a main reservoir line in electric service, is used as a signal line.

Trains of from two to seven cars are operated in regular service, the average acceleration on a straight level track being approximately one mile per hour per second up to 30 miles per hour, with a balancing speed of 60 miles per hour.

The electric installation was carried out by Messrs. Gibbs and Hill, of New York, the consulting electrical engineers for the Pennsylvania Railroad, in co-operation with the engineering department and the officials of the railway company. Messrs. Gibbs and Hill, it may be recalled, were the consulting engineers for the electrical equipment of the Bluefield-Vivian section of the Norfolk and Western Railway, which was fully described in our issue of July last.

Voltage of Live Rails.—With reference to the voltage on live rails in the working of an electric railway, we understand that while the Board of Trade have made no regulation preventing the introduction of any system employing a higher tension than 1,200 volts, they are advised that it is desirable some experience should be obtained in this country with 1,200 volts before this is exceeded. The statement is of interest in view of the use of 1,200 volts on the direct current system for the Manchester-Bury line of the Lancashire and Yorkshire Railway Company. A complete account of this electrification, together with 56 illustrations, appeared in The Tramway and Railway World of January 13.

Ilford's Electric Tower Wagon.—In the annual report of Ilford Council Tramways, Mr. L. E. Harvey, the manager, states that the Edison tower wagon has given the most satisfactory results. He expresses the opinion that if the hired horses used in connection with the permanent way were replaced by a 2-ton electric wagon the change would be profitable.

Digitized by Google

DIRECT-CURRENT TRACTION AT 5,000 VOLTS.

Accounts have recently been published in the American engineering journals of experiments which have been conducted on a line between Jackson and Grass Lake, Michigan, on the system of the Michigan United Traction Company. The main point to be established was the practicability of the use of direct current at a pressure of 5,000 volts for traction motors, and according to the reports the scheme is proving highly successful.

The controversy between the advocates of direct current and alternating current traction has been a long one, but a large section of engineering opinion is in favour of the former system in most circumstances. The great drawback to it has been the comparatively low tension, 500 to 600 volts, which was employed, necessitating on long lines numerous sub-stations for converting the high-tension alternating current used for transmission to the low tension direct current used at the motors. In this country an outstanding feature in the matter has been the gradual development by Dick, Kerr and Company, Limited, of a system both of generation of direct current of high tension and of motors and other equipment for dealing with it on the trains. By this scheme the advantages of direct current are obtained and its disadvantages are eliminated. For a considerable time the experimental work by the firm mentioned on the Bury and Holcombe Brook section of the Lancashire and Yorkshire Railway has been going on successfully. Here direct current at a pressure of no less than 3,500 volts is fed direct to the car motors. Overhead wire conductors are, of course, used. On the Manchester to Bury section of the same railway, which was fully described in our issue of January 13, a third rail conductor with direct current at 1,200 volts is being employed. This is the highest pressure yet used on a third rail conductor in this country, and the rail is specially protected. It hardly seems likely that the Board of Trade will allow very high pressures on third rail conductors, and we must look to the employment of overhead wires for further developments.

Though Dick, Kerr and Company, Limited, have been pioneering so long, progress of a more rapid kind in the way of application has been made in the United States, where there are fewer restrictions on developments and where there is abundant country to open up. It is about five years since 1,200-volt direct current was first tried in America. Then came 1,500 volts, and in 1913 came 2,400 volts on the Butte, Anaconda and Pacific Railway installation. This was followed by the use of direct current at 3,000 volts on a section in Montana of the Chicago, Milwaukee and St. Paul Railway. Such advances indicate how successful the new method is. Now we have the experiment resulting in regular operation of the line in Michigan with direct current at a pressure of 5,000 volts.

The experiment has been carried out for more than six months with a single car, and this in reality presents greater difficulties than if a powerful locomotive drawing a train were employed. The locomotive would afford more space for a large well-insulated motor and for all necessary auxiliaries.

In describing the equipment we shall mainly take as our guide Mr. N. W. Storer, general engineer to the Westinghouse Electric and Manufacturing Company, who recently contributed an article on the subject to the *Electric Journal*, of Pittsburg. The equipment was designed and built by the company mentioned for the purpose of determining the practicable limit to which voltages for direct current railways could be carried. Five thousand volts was selected for the initial limit, as it is high enough to make it easily possible to collect current for the largest locomotive from an overhead wire and high enough to lessen the amount of line copper and the number of sub-stations, and to secure a good load factor and efficiency at reasonable cost. The initial experiments involved the design and construction of two 2,400-volt motors and the necessary control equipment, which were mounted on a car and tested on the works railway at East Pittsburg in the spring of 1914. The equipment was first arranged for series-parallel control with voltages of 2,400 to 3,000 on the trolley; then the two motors were connected permanently in series, and the equipment worked at a trolley voltage of 4,000, which was gradually increased until the equipment was finally tested with 7,000 volts at the trolley.

The results were such that it was determined to place a complete four-motor equipment in service. The Michigan United Traction Company agreed to co-operate with the Westinghouse Company in the test, and offered the use of a branch line from Jackson to Grass and Wolf Lakes for the purpose. This line is about 12 miles long, and the high-voltage section extends to about two miles from the centre of Jackson. The car must therefore work over the 600-volt line within the city limits. The trolley line was re-insulated, and space was provided in a sub-station at Grass Lake for a mercury arc rectifier equipment to furnish the high-tension direct current for the car. A complete car equipment consisting of four 100 H.P. motors with control and auxiliaries was installed on one of the Michigan United cars. The complete car weighs about 40 tons. The entire equipment has been installed beneath the car.

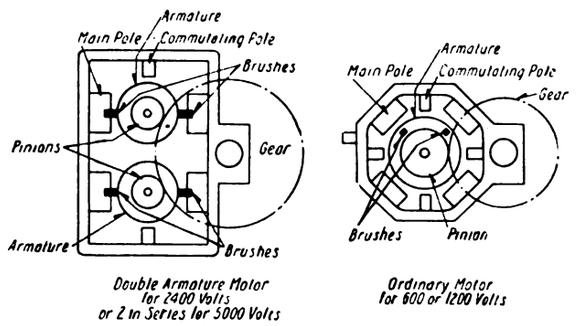
On June 1, 1915, preliminary tests were begun after the regular service had been completed for the day. They continued for a few nights until it was certain that the equipment was in proper condition, and the car was then put in daily service for the last two or three round trips between Jackson and the Lakes, which could be handled by a single car. Since that time the operation has been fairly regular for these trips, and up to date it has continued without a single interruption to the service due to the car equipment. It has not been necessary to change any detail in the equipment since service began, and it has always been ready for operation when line and power were available.

Of course, the most difficult part of the equipment would appear to be the motors. It is well understood that in order to secure the maximum benefits from electrification a railway must be able to operate not only locomotives but multiple-unit car service; consequently, any system of electrification that hopes for recognition for heavy traction purposes must be suitable for operation on passenger cars. It is not so difficult to secure space for the necessary number of commutator bars and the creepage surface for insulating large locomotive motors for high voltages, but it has been a serious problem to secure these requisites for a motor of the size required for ordinary inter-urban cars without exceeding commercial limits for weight, cost, and dimensions. The motor is known as a twin armature bi-polar motor, and has many advantageous features for high voltage work. The bi-polar motor permits the use of double the voltage on a given commutator that is possible with a four-pole motor. The twin armature type weighs little more than a corresponding four-pole motor; fewer field coils are required than are used with the four-pole motor; the two armatures, being geared to the same axle, act as one unit, and cut the pressure on the gear teeth in half. The two armatures are connected in series; conse-

Digitized by Google

quently, the voltage on each is reduced to lower limits. The form of motor lends itself readily to a very effective type of insulation. The mechanical construction is simple and rugged.

The performance of the motors has thus far been all that one could ask. There has yet to appear the first defect in any motor that has been built. The commutation is sparkless, and the stability of the motor,



Comparison of 5,000-volt Motor and Ordinary Motor.

as shown by its absolute freedom from flashing, is perfect. Large creepage surfaces are supplied, both on armatures and brush-holders, in order to give immunity from grounds. One characteristic that will assist in the maintenance of the insulation is the fact that the current is small—being only 16 amperes for each 100 H.P. motor—that only a few small brushes are required, and with the excellent commutation, there is very little wear either on brushes or commutators, and consequently the amount of carbon and copper dust originating in the motor will be small. It is fully recognised that upon the permanence of the insulation depends the success or failure of the experiment, and this is something that time alone can determine.

In starting, the eight armatures of all motors are connected in series. After the car has accelerated, and the controller is thrown to the running position, the motors are operated in two parallel groups, each group having two motors (four armatures) connected in series. Therefore the maximum voltage impressed across a single armature is 1,250 volts. The series field windings of the motors are all connected near the ground side of the circuit, therefore the field coils are insulated for low voltage operation. The armature coils, however, are insulated for 5,000 volts.

The commutator is but 3 in. wide and has the mica between segments undercut in the usual manner. Standard carbon brushes are employed. Contrary to what might be expected, with a direct current operating voltage of so high a value, the commutator shows no arcing whatsoever. In fact, it is in perfect condition. Each twin motor is equipped with two commutating poles, one at the top and the other at the bottom.

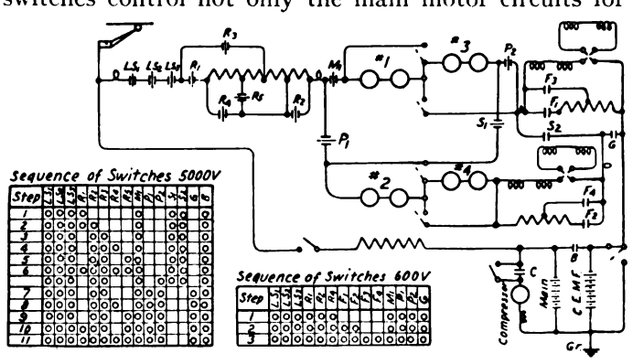
Regarding the control, in order to secure a relatively large number of breaks in series without increasing the number of switches unduly, each switch was made with two breaks in series. The switches are similar to the standard Westinghouse electro-pneumatic switches, but have some special features. The object was to secure safety and reliability in opening the high-voltage circuits, and the most effective distribution of insulation. The frames of the switch group are grounded, and the interlock wiring is thoroughly protected in order to isolate the high-voltage current from the control wiring and master controller. A novel feature is the use of an "arc splitter," consisting of a piece of soapstone placed in front of the switch jaws in the path of the arc. The effect of the magnetic field is to blow the arc against this along its entire length until it is broken. The operation of the switch groups has been fully as satisfactory as that of the motors.

The starting rheostat is composed of cast alloy grids in a number of frames. The latter are insulated from ground by triple insulation and from each other by double or quadruple insulation.

For the purpose of working through the city of Jackson on a 600-volt circuit, a change-over switch is provided, which connects the four sets of armatures in parallel.

The entire auxiliary equipment 's worked from a 150-volt circuit. A 150-volt storage battery, to which all of the auxiliaries are connected, is placed in the main motor circuit between the motors and ground. All the main motor current therefore either goes through the battery and charges it, or through the auxiliary circuits which may be connected to the battery at the time the motors are working. By the application of a simple device the air compressor does practically all of its work when the main motors are operating, and thus simply diverts a part or all of the main motor current as required, so that the battery is relieved from furnishing the current to the compressor motor and at the same time does not receive the high charging currents that would otherwise be imposed on it during acceleration. The battery has thus a very light duty to perform, and can be made up of small cells.

In the main schematic wiring diagram given below the double break switches are indicated by three parallel lines across the circuit and the single break switch by two lines. It will be seen that there are twelve of the former and ten of the latter required for this equipment. Considering the fact that these switches control not only the main motor circuits for



Schematic Control Diagram of 5,000-volt D-C. Equipment.

both 5,000 and 600 volt operation, but all of the auxiliaries as well, the equipment is very simple. Very satisfactory operation on 600 volts is secured by shunting the fields of the motors.

Power for operating this car is obtained from three mercury arc rectifiers, which receive power from a 60-cycle, three-phase system, and are operated in series. Connecting the three phases of the system in series gives not only a smooth current wave, but balances the load on the three phases of the transmission system. This is believed to be the first time mercury arc rectifiers have been used in this way to furnish so much power for high voltage work.

It is fully recognised that these tests have not continued long enough to draw any definite conclusions as to the future use of 5,000-volt direct current for railways. All that can be stated at this time is that the preliminary tests are extremely satisfactory, and the fact that no difficulties in the car equipment have appeared to date indicates that there is ground for the hope that the 5,000-volt direct-current railway is a possibility.

It will be noticed from the above description that high-tension direct-current generation is not involved. The working current is derived through the rectifiers from a high-tension three-phase supply.

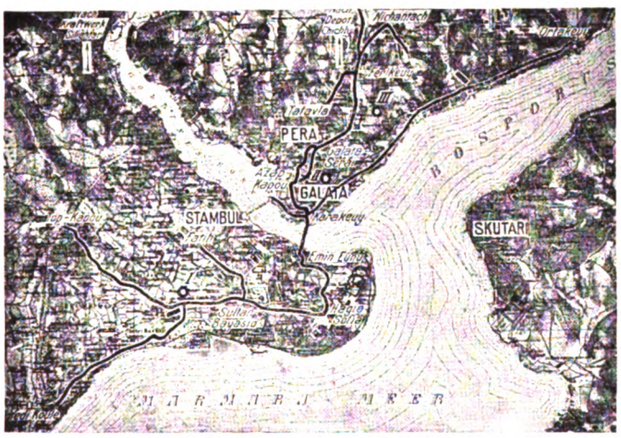
Digitized by Google

MODERN TRACTION AND A MEDIÆVAL CEREMONY.

That "east is east and west is west, and never the twain shall meet," is strikingly exemplified in the curious scene depicted in the illustration below. It is a photograph of a rite performed on one of those familiar and very modern occasions, the formal opening of an electric tramway. In most civilised countries when the labours of the financiers, the engineers, and the contractors have been happily completed, and the electric car conveys smoothly over welded joints the applauding populace, whatever else may have been bled no innocent and inoffensive ram is called upon to shed its blood as a propitiatory offering. It is true that even in the immaculate United States certain creatures known in Wall Street as "lambs" are sometimes "sheared" in the process of electric railway promotion, but that operation is not commonly heralded by a public ceremony. There is this similarity, however, between the sacrifice of a ram in Constantinople and the shearing of a "lamb" on the opening of an electric tramway—both are intended to serve a useful if illusory purpose. In the latter case the idea is that the promoter deserves a suitable reward for his services in the past, while in the former case the celestial powers require to be propitiated lest they should interfere with the smooth working of the cars in the future. As far as we have been able to ascertain, the electric tramways of Constantinople have not suffered from supernatural interference since their opening several years ago. Their history has, in fact, been uneventful until a few months ago, when a British submarine considerably damaged the famous Galata Bridge over the Golden Horn, across which the tramcars ran. Previous to the war 160 motor cars were in service or on order, besides a number of trailer cars. The equipment of the line presents no special features. Working at the customary pressure of 500-600 volts, the motors were of a type common on the continent of Europe, and the single-deck cars were provided with a bow trolley.

The Ceremony at the Linking-up of the Constantinople Tramways.

The undertaking is not, however, without significance, because it forms an instance of the enterprise by which German firms, assisted by Government influences, and, in this case, by active official participation, have been enabled to secure control of local enterprises in the near East. There was a time when tramway enterprise in Turkey was entirely in British hands; and it is safe to say that if our Government had been as greatly concerned that our interest in these undertakings should be continued under the new conditions of electric traction as the German Government was, that they should be supplanted, the work would not have passed out of our hands. The same supine policy which at length cost us the antagonism of Turkey had for many years been a source of discouragement and defeat to many enterprising business men who, with more energetic co-operation on the part of our official representatives, would no doubt have greatly strengthened our influence.



Map of Constantinople Tramways.

Digitized by Google

THE
Tramway and Railway World

FOUNDED IN 1892 AND PUBLISHED BY
THE TRAMWAY AND RAILWAY WORLD PUBLISHING COMPANY, LIMITED,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

SUBSCRIPTION:

THE TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum

THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

FOR ALL PLACES ABROAD—Thirty Shillings per annum.

Single Copies—One Shilling (Postage, 2 pence—Abroad, 5 pence).

THE EDITORIAL AND PUBLISHING OFFICES OF THE TRAMWAY AND RAILWAY WORLD ARE AT AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Telegraphic Address: "TRAMIGRO, LONDON."
Telephone No.: GERRARD 2948.

LONDON, FEBRUARY 10, 1916.

A Review of the London Traffic Position.

In this issue the full text is published of a highly interesting paper on London traffic by Sir Albert Stanley, managing director of the Metropolitan District Railway Company and associated companies. The paper was presented to the International Engineering Congress, which was held in San Francisco in the latter part of September. Though there has been some unavoidable delay in presenting it to our readers, the paper is well worthy of study. Many of the main facts are known by students of the subject, but Sir Albert's paper has several great merits. One is that it is a comprehensive review of the subject, and another that as it was addressed for the most part to those unfamiliar with the *locale* and conditions of the undertaking, it is, so to speak, an exposition to people knowing little or nothing of the matter, and it thus has much freshness. Too often those who have followed a given subject for a long time are apt to get into the state of not being able to see the wood for the trees. Many general facts tend to sink into the realm of sub-consciousness, and such a paper as the one now referred to is a valuable corrective and a sharpener of the apprehension. In making reference to the various means of public transit in London, Sir Albert dwells on the difficulty of co-ordination, the lack of a general authority, and the need for a Traffic Board, as recommended years ago by a Royal Commission. It is only natural that, speaking with the special information at his disposal, the managing director of the biggest local transit organisation in the metropolis should give much detailed information as to passenger traffic which cannot be obtained from ordinary published reports. For example, the details as to traffic fluctuations according to the season, the day of the week, and the hour of the day, will be noted with interest. His history of the development of the train services on the main line of the District Railway is well worthy of attention. In the days of steam traction the maximum number of trains per hour in each direction was 18. After the adoption of electricity ten years ago efforts were made to get over the difficulty arising from the fact that six branch lines converge on the main route. By system, by the adoption of automatic signalling with short block sections, and by the construction of fly-over junctions, the number of trains was gradually increased till it reached 43 an hour in each direction. Within recent months (as noted in our last issue) it has reached the wonderful figure of 50. Sir Albert has a good deal to say on the subject of fares, and points out as desiderata that they should be even in incidence, sure and settled in composition, and simple in arrangement. That is by no means the case at present. Urban railways, tramways, and motor omnibuses alike come under review, and the last-mentioned are very favourably spoken of. In regard to the present low return on the capital invested in the various undertakings, Sir Albert is quite sanguine that the traffic can be so expanded as materially to improve dividends. The general conclusion is that further development can only be properly secured by a spirit of co-ordination and co-operation among all the interests concerned. The fostering of such a spirit, however, is the difficulty, for it is not easy to bring about co-operation between municipal bodies and private enterprise. Still, there have been some encouraging beginnings in London, and something may be hoped for. And that brings us back to the old necessity which the London County Council and the companies alike desire, but to which the Government object—the constitution of a Traffic Board.

Digitized by Google

Rail Corrugation. This question is always with us, and a solution has not yet been found. Remedies suggested, if of any use at all, are very partial. Naturally it is not easy to find a remedy for an evil so long as the cause or causes of the evil are unknown. The two British tramway associations, which a few years ago were hard at work investigating the problem, appear to have slackened their efforts ; at all events little in the way of reports from the investigation committees has recently been published. The subject is again being discussed in the American engineering press, but it cannot be said that any great new light has been thrown on it. One writer thinks that the trouble is caused by load concentration due to reduced area of contact as the result of irregularities, or of a difference between the contours of the rail head and the wheel tread. This theory has the advantage that its accuracy can be tested by providing wheels and rails that conform to one another. The writer in question has tested his theory, with the result that no corrugation appeared in five years. Mr. R. B. Holt, in his work on tramway track, points out that much wear of rails is caused by the wheel tread and the rail head being of different contours. A new tire will not fit a worn rail and *vice-versa*, and the remedy is to design the rail head so as to fit a partially worn tire. This remedy for irregular wear is the same practically as the American's remedy for corrugation, but if it were always effective there should be less corrugation than we see. A fairly worn tire and a fairly worn rail represent ordinary conditions, and they are generally associated with a full bearing across the width of the rail tread. Another American writer revives the old idea that corrugation is caused by rigid track construction. But there are plenty of lines in foreign countries, some of them steam railways, which are laid on sleepers so as to give an elastic track, and yet corrugations appear. Years ago reports from India showed that railway rails were corrugated when one kind of ballast was used, and not corrugated when another kind was employed. It is to be feared that the Americans are no nearer the solution of the problem than we are.

Efficiency Meetings. The inauguration of a series of what are called efficiency meetings of the officers of the various departments of the London Underground Railways and of the London General Omnibus Company is a departure which ought to prove of much value. Staff meetings in connection with various undertakings are familiar enough ; they are held for the discussion of immediate business and the arrangement of things of the moment. But the efficiency meetings here referred to are of a wider scope and directed to more general views for the purpose of improving the efficiency of all the departments concerned. They are like meetings of a highly specialised technical society at which certain subjects only are dealt with, but are considered intensively and exhaustively. Papers are read and discussed, so that the collective knowledge and opinions of the officers are brought to bear on each subject. The essence of the matter is the discussion of methods adopted in the operation of the railways and the omnibuses with a view to improve them still further. The opening meeting, which is reported on another page, dealt with the subject of employees' mess-rooms and their organisation, and among the matters to come before subsequent meetings are a parcel system on the Underground Railways, the graphic representation of operating returns, time tables and duty sheets, and tickets and other checking devices. Mr. H. E. Blain, the operating manager, to whom the initiation of the plan is due, is to be congratulated on an innovation that might usefully be adopted in the case of the larger tramway undertakings of the country. Anything that encourages *esprit de corps* and promotes enterprise and a certain enthusiasm in work that tends too easily to degenerate into prosaic routine is an experiment well worth trying.

Dublin Tramway Results. In the United Kingdom there are now few companies operating tramway systems in large cities. The Dublin United Company is one of the few, and it is interesting now to compare some of its accounts with those of the pre-war period. The company, which was formed nearly twenty years ago to acquire the old Dublin United Company and the Dublin Southern Company, has always

Digitized by Google

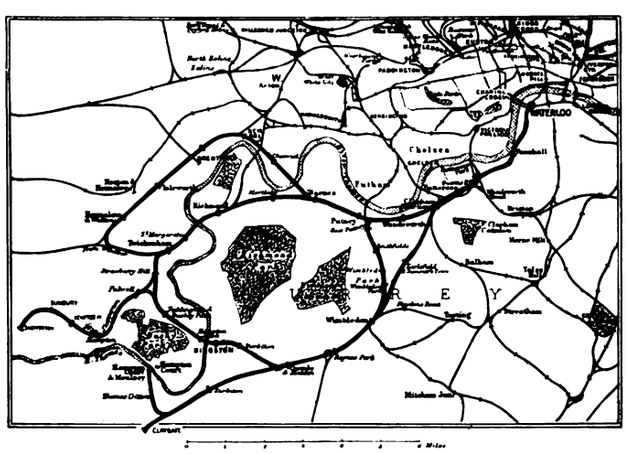
been well managed, and has steadily paid good dividends. The report for the year 1915 just issued shows a total revenue of £333,899. This compares with £297,731 for the year 1913, the last complete year before the war broke out. To some extent the figure for 1913 was affected by strikes, and there was a recovery to £321,896 in 1914. Last year the total expenses were £209,383, as compared with £177,858 in 1913. After meeting fixed charges, etc., the balance available for dividend was £95,845, which is £7,805 better than the corresponding figure of two years before. The usual conservative financial policy of the directors has, however, been even more emphasised than before, as the dividends on the ordinary shares are only 5½ per cent. per annum as compared with 6 per cent. for 1913. Much larger sums are set aside for reserve and renewals, and the carry-forward is substantially greater. These results were obtained by carrying over 60 millions of passengers, or six millions more than in 1913. At both dates the length of route was the same, namely, 54 miles. The economy in operation may be judged by the fact that the purely working expenses average less than 6¼d. per car-mile. The company is thus on a sound basis, and can look forward with confidence to the future. That future is also considerable as to time, as the lines cannot be purchased by the local authorities till the end of 1938. As a set-off to that, the wayleaves payable to the local authorities amount to about £15,000 per annum. Though that is by far the biggest item among the fixed charges, the company continues to bear the burden of it without trouble. The company has for many years had the advantage of being managed by some of the best business men in Ireland, and though during the past year it had the misfortune to lose by death two well-known and respected officers, there is no lack of capable successors to carry on their work.

Melbourne and Sydney Electrifications.—An application has been made to the Victorian Legislature by the Railway Commissioners for a loan of £800,000 towards the electrification of the Melbourne Suburban Railways, excluding the construction and alteration of rolling stock An announcement has been made by the New South Wales Minister for Public Works, that the construction of the City Electric Railway will be begun in March. Work is being pushed on in connection with the electrification of the Sydney North Shore Railway. The Railway Department have been advised to proceed with the construction of new rolling stock, so that it may be ready for use as soon as power is available.

"SOUTH WESTERN" ELECTRIFICATION.

On January 30 electric trains began running on the Kingston loop and the Shepperton branch of the London and South Western Railway. The opening of electric traction on these routes had been delayed owing to Post Office complaints of interference with telegraphs and telephones, but that matter has now been partially adjusted. The length of the South Western Railway Company's suburban lines which are being electrified is 47 route miles. The Kingston loop and the Shepperton branch, together with the main line from Waterloo to Wimbledon, *via* Putney, which has been working electrically for some weeks, account for over half the total length. The remaining suburban lines are expected to begin electric operation shortly. A full and illustrated description of the undertaking appeared in our issue of November 18 last.

The new trains are running to Shepperton with great smoothness and celerity. The stops at stations have been cut down to half a minute each, and this, coupled with rapid acceleration and a higher maximum speed than that of the steam trains, has reduced the schedule time very appreciably. Moreover, instead of the long intervals between the steam trains, there will soon be a ten minutes service of electric trains in each



South Western Electric Lines.

direction on the Kingston loop. This loop service is one of the most important of the suburban services of the company.

The district covered by the electric trains includes a number of popular places, which will gain much by being brought within closer reach of that "full tide of human existence" which, as in Dr. Johnson's day, still flows about Charing Cross. Moreover, much of the route has great potentiality as a residential district, which has only been partially developed under the somewhat antiquated service hitherto provided. It is a fact, we believe, that the train service to Wimbledon, a town of some 60,000 inhabitants, until the end of last month enjoyed practically the same direct service to Waterloo that was provided for it 20 years ago. Such instances as this give some indication of the immense opportunities that our railways have let slip in the indolent *ante bellum* days. It may be thought that in the period after the war our impoverishment will be so great that railway improvement will be out of the question. On the contrary, however, the necessity of economy in operation will be so severely felt that electrification on a scale hitherto unknown will become imperative. Neither time or money can then be wasted in the slow and extravagant steam service of metropolitan suburban lines.

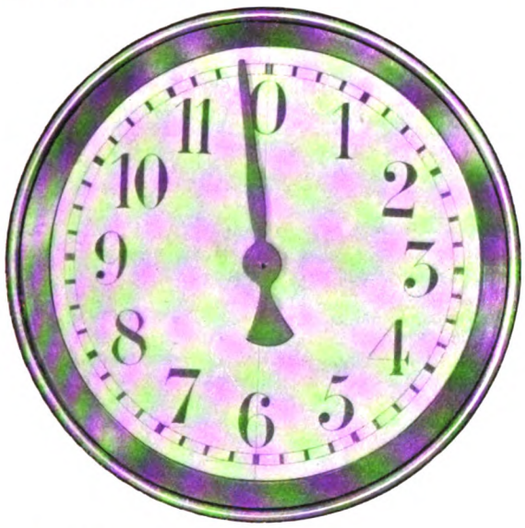
Digitized by Google

HEADWAY INDICATORS IN TRAMWAY SERVICE.

The great aim of the manager of a tramway system is to maintain a constant service of evenly spaced cars. Not to provide such service is a serious impediment to the growth of traffic. If there are long intervals between the cars crowds of passengers collect at various points, so that when the belated car arrives it has to make an abnormally long wait before it can set down and take up the increased number of passengers with which it has to deal. This fault, instead of being removed, is increased at every stopping point, and results in over-crowding and consequent grumbling with further delay to tramcars following.

The old method of placing a man at certain fixed points to act as a timekeeper is open to many objections, principal among which is the human element of error. There is also the expense of wages to be dealt with.

To overcome this difficulty, the Equipment and Engineering Company have recently acquired the patents of the Dallett electrical headway indicator, which was, until quite recently, manufactured by the late National Electric Time Company, of Clerkenwell. These indicators, one of which is shown in the accompanying illustration, consists of a very simple device, including a solenoid which actuates a train of gear wheels incorporating a self-starting escapement. The whole is mounted in an iron case provided with a dial and single pointer as shown. To actuate the indicator in tramway work, it is erected upon one of the trolley standards by suitable clips or upon a convenient wall site, and a skate contact is fitted upon the adjacent trolley wire.



The action of the device is as follows :—

A car passing under the skate causes current to flow to the indicator and round the coils of the solenoid referred to. This actuates the train of gear wheels by means of a chain and draws up a driving weight, the movement being steadied by means of an air dash-pot. This action also has the effect of bringing the pointer from any reading it may have shown upon the dial back to zero. When the car has passed and the solenoid in the indicator has ceased to be energised, the driving weight comes into action and propels the pointer round the scale under the restricting influence of a small self-starting pendulum escapement. The normal dial is made for a maximum interval of 12 minutes, but, of course, it is possible to make them for any scale up to 30 minutes.

In such a simple mechanism as that described, there is very little to get out of order. The whole of the mechanism is strong and suited to the most severe conditions. To enable access to be obtained to the working parts when necessary, the dial is split vertically down the middle, so that when the front bezel, which fits with a weather-proof joint, is removed, and a small latch unfastened at the top of the dial, the two halves fall sideways and the whole of the indicator is exposed.

These indicators have been in use for some years upon the Metropolitan District and the London Tube Railways, where they have proved their efficient action. They are, indeed, an absolute necessity where automatic signalling is used. There is no means, other than the indicators, to inform the drivers of the headway space in front of them, and without their use there would be continual trouble owing to trains getting out of spacing, and also having to stop in tunnels against a signal, necessitating another starting current. The use in tramway systems is obvious, especially upon routes where the service of cars is scarce. The Equipment and Engineering Company, of 2 and 3, Norfolk Street, London, W.C., are prepared to supply an indicator for trial purposes to any company who are considering the adoption of these devices, and will also be glad to furnish full details to anyone who communicates with them.

THE BRADFORD POWER BRAKE.

Adverting to the new power brake in use on some of the Bradford Corporation tramcars, Mr. J. C. Spencer, the general manager of the tramways department, writes as appended in the 1914-15 report to the Tramways Committee :—

"In my last report I stated that our experience up to that time was very satisfactory, but experience had not been sufficiently lengthy to do more than briefly comment thereon. Now, however, I am enabled to state very definitely that the effect upon accidents of the introduction of this new brake has been very marked.

"As the committee are aware, this brake was designed mainly in the interests of public safety. Its main principles are as follows :—No skill is required on the part of the driver for its application. If anything happens to the mechanism, the result is the application of the brake, and consequent stoppage of the car. In case of need, the conductor can apply the brake against the driver, but he cannot take it off against him. It is possible, without any fear of skidding, to pull up a car fitted with this brake in a remarkably short distance. We have now 75 cars fitted with the brake, most of which have been in use for the full year under review. Some of the brakes have been in use for several years.

"The average cost of drivers' accidents throughout the system on all cars taken over a period of four years, including the period under review, amounts to £3 11s. per car per annum. The average cost of drivers' accidents with cars fitted with power brake is 3s. per car per annum, so that quite apart from the question of preventing serious runaways and disasters, the brake has proved extremely valuable in the ordinary way in keeping down and reducing the seriousness of inevitable street collisions, which take place on every system. As against this, it is necessary to consider what, if any, is the extra cost of maintenance of this brake against the old type of mechanical brake. From careful experiments that have been made, and from the records obtained, it is shown that with intelligent handling the increase in current consumption of cars fitted with this brake is so small as to be practically negligible.

"The cost of repairs and maintenance may reasonably be expected to be in excess of the hand applied brake, but in making full allowance for the more or less experimental nature of parts of the apparatus, which it has been found necessary to re-design and improve, there is no reason to think that the cost of maintenance will be seriously in excess of that of the mechanical brake, which it has replaced, for whilst on the one hand there is an increased wear of cast-iron in brake shoes, as against the old wood and iron shoes, there is a very considerable saving in the wear of tires on the other hand. It has been found as a matter of fact that the increased life of steel tires in consequence of this brake is in the neighbourhood of 85 per cent.

"From the drivers' point of view, the impressions, so far as I am able to ascertain them, are unanimously in favour of this apparatus. Unfortunately the outbreak of war has prevented the continued fitting of cars, the manufacturers being entirely occupied on war material. An examination of the return of accidents will show that with the exception of the number of collisions with other vehicles, every other class of accident has increased. This, it seems to me, is inevitable when it is remembered that about 25 per cent. of the staff has been replaced by new and inexperienced labour, and it is remarkable that the effect has not been more serious."

IMPROVEMENTS AT TERMINALS.

Newcastle and Portsmouth Projects.

The great increase in the number of motor vehicles to be seen on roads where suburban tramways terminate in dead ends is likely to force many tramway authorities to consider the advisability of adopting means to secure the safety of their passengers on entering and leaving the cars. In our issue dated November 18, we gave a description and illustrations of the method devised to secure that result in the case of the Chorlton terminus of the Manchester Corporation Tramways. At that place a looped siding, connected at each end to the main track, has been constructed, together with a shelter for passengers and offices for the employees.

Portsmouth Tramways Committee are about to present to the Corporation a plan for preventing the congestion and danger that occurs at the Cosham terminus during the summer and on holidays. Messrs. W. R. Spaven (general manager) and V. G. Lironi (electrical and permanent way engineer) have prepared a scheme for converting the dead end into a circular line. The main stopping place will be at the west corner of a plot of ground that is proposed to be purchased. The cars would continue round the half circle to the opposite side, where covered queues are to be constructed. These gangways will lead to a series of lines from which cars will start on the return journey. Provision is made for illuminating the queues and the destination signs at night.

On account of the narrowness of the roadway where the Scotswood terminus is situated, Newcastle-on-Tyne Tramways Committee have obtained a piece of land in order to construct a loop line. Cars from Newcastle will be able to run along it to the set of rails for the return journey without reversing the trolley pole. The loop can also be utilised for cars waiting to take their return citywards.

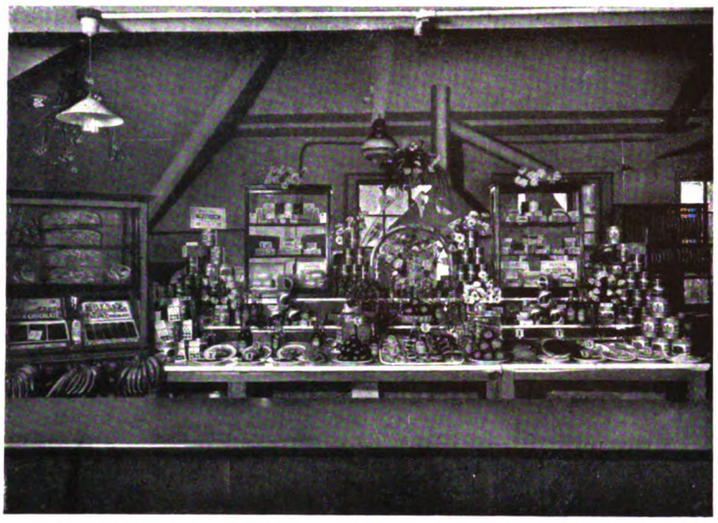
Digitized by Google

EFFICIENCY MEETINGS.

LONDON TRAFFIC COMPANIES' NEW DEPARTURE.

A commendable innovation has been instituted in the form of a series of efficiency meetings, arranged for the officials of the operating department of the Underground Railways and London General Omnibus group, by Mr. H. E. Blain, the operating manager. The first meeting was held at Electric Railway House, Westminster Broadway, when a paper on "Mess Rooms and Their Organisation" was read by Mr. S. G. Rodway, mess room superintendent of the London General Omnibus Company.

The chair was occupied by Mr. Blain, amongst others present being Sir Albert H. Stanley, managing director; Mr. James Devonshire, managing director of the London and Suburban Traction Company; Mr. Z. E. Knapp, railway manager for maintenance and construction; Mr. W. F. Rainforth, assistant chief engineer, L.G.O.C.; Mr. J. P. Thomas, general superintendent, L.G.O.C.; Mr. H. Lansdown, assistant general superintendent, L.G.O.C.; Captain A. Rozier, A.S.C., superintendent of training and employment, L.G.O.C.; Mr. W. J. Blake, railway superintendent of the line; Mr. S. J. Webb, railway passenger agent, and more than thirty other officials.



L.G.O. Standard Mess Room Equipment.

The Chairman remarked that the series was being arranged for the purpose of enabling both the outside and inside officials to discuss, from an efficiency standpoint, the methods adopted in the operation of the railways and omnibuses, with a view to improve them still further. For this purpose the frankest expression of opinion was invited.

Sir Albert Stanley paid a tribute to the manner in which the work of the department had been carried on during the exceedingly trying conditions since the outbreak of war, and referred to the desire of the companies and the directors that every member of the staff should feel his suggestions would be valued and appreciated, there being the greatest possible desire for close connection between the employees and the companies.

Mr. Devonshire also made some appropriate remarks.

Mr. Rodway's paper detailed the mess room organisation connected with the London General Omnibus Company, Limited. In all the later built garages it was now the policy to erect large and comfortable rooms available as mess rooms and institutes, where the catering was provided at the lowest possible price, and where facilities for billiards, etc., were also afforded. The first of these institutes was opened at Hendon Garage on May 1, 1913, since which date sixteen others had been opened, these being at Cricklewood, Willesden, Seven Kings, Streatham, Merton, Milman's Street, Hammersmith, Turnham Green, Chelverton Road, Golders Green, Forest Gate, Holloway, Hounslow, Plumstead, and Catford. Catering facilities were furnished at Victoria Station. The gross number of purchases made at these mess rooms per annum was about two millions, the average amount of each transaction being 2·44d.

The food, etc., was sold at a cost which practically covered the wages of the mess room working staff, but the account was not debited with any portion of the cost of construction, maintenance, or lighting of the institutes. Attention was directed to the increased cost of foodstuffs, and a chart was exhibited showing the increased prices and fluctuations of the principal dry goods used. The war had forced upon the mess room organisation a higher state of efficiency, but by the careful selection and introduction of modern devices for saving labour and material, such as automatic potato peelers, patent boilers, floor scrubbers, etc., and by making all the pastry at home instead of purchasing from outside sources, it had not been necessary to raise the tariff, except very slightly in connection with tea.

In the subsequent discussion, the different methods of the railway mess rooms were alluded to, the first mess room in which the company carried out the catering having been opened on the Piccadilly line in May, 1912.

For the inspection and criticism of the audience, samples of the omnibus standard mess room equipment had been arranged as an exhibit, and the discussion was of a practical character, embodying the views of purchasers as well as the organisers.

At subsequent meetings the following topics will be discussed:—A parcels system on the Underground railways; the graphic representation of operating returns; time tables and duty sheets, comments and criticisms on methods and practice; railway and omnibus tickets, and other checking devices; a "safety first" campaign—a sound proposition with an unsound title; social welfare and co-operative developments; advertising, publicity, and decorative developments, etc.

TRACK MAINTENANCE.

COST UNDER MANAGERS, ELECTRICAL ENGINEERS, AND SURVEYORS.

Aberdeen Corporation, at their January meeting, discussed the Tramways Committee's recommendation that a remit be made to them to report as to the existing arrangements in connection with the maintenance and repair of the track and permanent way, and as to what alterations or modifications, if any, the committee would recommend should be made.

In moving a direct negative, Councillor Leith, chairman of the Streets and Roads Committee, said that Aberdeen was in the first rank amongst municipal tramways for maintenance. The average cost throughout the United Kingdom was, under managers, 0·62d. per car-mile; under electrical engineers, 0·55d. per mile; and under burgh surveyors, 0·50d. per mile. In Aberdeen the cost under the surveyor was 0·33d. per mile, or less than two-thirds of the average cost all over the country. The annual cost of permanent way per mile of single track, under the same head, was £168 for the United Kingdom, and £97 for Aberdeen. In two-thirds of the corporations the surveyors had charge of the permanent way. He urged that the new surveyor should be given an opportunity. Councillor George, in seconding, stated that Mr. Gordon, the new surveyor, had agreed to submit to the Tramways Department at the beginning of every month the work he proposed to do, and the system should be given a trial.

Billiard Room at a London Garage.

Councillor Robertson (chairman of the Tramways Committee), in moving the recommendation mentioned that large sums had been saved by the committee investigating reports on proposed repairs.

Although the chairman of the Tramways Committee withdrew his resolution in favour of an amendment to remit the question to both the Tramways and Roads Committees, the Council decided to make no change in the existing arrangements.

Digitized by Google

ELECTRIC RAILWAYS.

The James Forrest Lecture, 1915.

The twenty-third James Forrest lecture was delivered before the Institution of Civil Engineers on December 14. The subject was "Electrical Railways," and the lecturer was Mr. H. M. Hobart, in whose absence in America the lecture was read by Mr. John A. F. Aspinall. The President, Mr. Alex. Ross, mentioned that Mr. Forrest, in whose honour the lectures were founded, had now entered on his ninety-first year. Mr. Forrest's association with the Institution had extended over a period of nearly 73 years, and the members sincerely hoped that Mr. Forrest might live to read many more lectures delivered in his honour.

Mr. Hobart's lecture was of such great length that here it is only possible to indicate its contents and to summarise some of its main features. The first part of the discourse was retrospective. In this regard, as in others, the lecture dealt for the most part with heavy freight train traction in America. The following extract, with tables, indicates developments in America:—

Although trains hauled by electric locomotives were in regular operation in 1890 on the City and South London Railway, the first application of electricity to train haulage in America was in May, 1895, when electric locomotives were employed by the Baltimore and Ohio Railroad to haul trains through its Belt Line Tunnels in Baltimore. The rate at which the electrification of sections of American steam railways has grown since that date may be seen from the following table:—

Year.	A.—Electrically-Equipped Single-Track Mileage of Steam Railways in the United States and Canada.	B.—Total Single-Track Mileage of Steam Railways in the United States and Canada.	$\frac{100\ A}{B}$
	Miles.	Miles.	
1895	8	233,000	...
1900	51	259,000	...
1905	215	307,000	...
1910	1,580	352,000	0·45
1915*	3,460	380,000	0·91

* The figures for 1915 include mileage now being electrified.

The above figures, however, do not indicate the growth of the electric railway industry in America. The greatest activity has heretofore related chiefly to independent electric railway undertakings not necessarily involving the operation of trains. The rapid growth of this business is indicated by the statistics in the following table:—

Year.	Total Single-Track Mileage of Electric Railways in the United States and Canada.	Total Number of Motor Cars.
	Miles.	
1890	1,260	5,600
1895	12,100	26,000
1900	19,300	43,600
1905	32,500	64,000
1910	40,000	89,600
1915	45,000	100,000

Cost of Electricity Production.

Dealing with the rapid decrease in the cost of electricity, the lecturer said that it would have been impossible twenty years ago to manufacture electricity at a cost of much less than 2d. per kilowatt-hour. Ten years ago a price of 1d. per kilowatt-hour would usually have been the minimum permitting of any profit. At present there are electricity supply undertakings which could make a profit in supplying electricity to railways in their district at but little over ½d. per kilowatt-hour.

Fifteen years ago the best available electricity generating sets consisted of slow-speed reciprocating engines direct-connected to electric generators. A 3,000-kilowatt set was considered to be about as large as could be used to advantage. Such an engine and generator cost some £30,000 (or £10 per kilowatt). At present 30,000-kilowatt steam turbine-driven sets are available at a price considerably below £60,000—that is to say, the set with ten times the output costs less than twice as much.

Furthermore, while the 3,000-kilowatt generating set of fifteen years ago consumed some 18 lb. of steam per kilowatt-hour, the present day 30,000-kilowatt set only consumes some 12 lb. of steam per kilowatt-hour, i.e., two-thirds as much. The corresponding progress in steam-raising plant and condensing plant has also been by no means inconsiderable, and in conjunction with the requirement of only two-thirds as much steam and fuel, may be roughly taken as at least halving the initial outlay per rated kilowatt installed, for these components of an electricity manufacturing plant.

Discussing the relative merits of hydro-electric and steam stations, Mr. Hobart said that in districts where coal is obtainable at a low price it is rarely possible for a hydro-electric plant to supply electricity at a competitive price except for applications with a fairly high load factor. The price for electricity manufactured in a coal-burning station is much less controlled by the maximum demand and much more controlled by the quantity of electricity consumed in a given time than in the case of a hydro-electric undertaking. While the fixed charges are much lower than the operating costs for the steam undertaking, the reverse is the case for the hydro-electric undertaking. For very low load factors, the steam undertaking can supply electricity at the lowest cost, but for load factors above 0·20 the hydro-electric undertaking has the advantage, and for unity load factor the hydro-electric can supply at practically half the price attainable with the steam undertaking. Since an extensive electric railway will have a fairly good load factor, this is one reason for the remarkable progress made with railway electrification in countries which are rich in water power.

The author proceeded to work out figures to show the influence of fuel cost on the total cost of producing electricity in steam-electric stations. He explained how load factor is improved by increasing the number of electric locomotives supplied, and he noted that the ratio of the combined load factor of the locomotives in use to the average of their individual load factors is called the diversity factor. This led to the following conclusion. One of the most important attributes of the electric-locomotive system of propelling trains relates to the ability to take scientific advantage of the diversity factor of a system comprising many locomotives in providing a high resultant load-factor and to secure economies incident thereto. In fact, the resultant load-factor of the railway's load will combine with the resultant load-factor of the loads of other consumers to yield an ultimate resultant load-factor at the generating station which will usually be appreciably better than the railway's own load-factor. Consequently, a railway rarely manufactures its own electricity for its own exclusively railway load at so low a cost as that at which it can be manufactured by an electricity-supply company whose system comprises the loads of other large consumers.

Butte, Anaconda, and Pacific Railway.

The author proceeded to describe and to discuss results obtained on certain steam railways in the United States which have been changed to electric traction. Descriptions of the electric equipment of these lines have already appeared in our pages. In regard to the Butte, Anaconda and Pacific Railway, the conclusion reached by Mr. Hobart was that the outlay for fuel and power when steam locomotives were used was 19·9d. per locomotive mile, while with electric traction it is only 7d. per locomotive mile. The price of locomotive coal was 19s. per British ton, and the cost of electricity delivered at the sub-stations is 0·265d. per kilowatt-hour. In describing the electric locomotives used, Mr. Hobart pointed out that the average weight of the copper ore trains hauled by the steam locomotives was 1,600 tons, while the average weight hauled by the electric locomotives is 2,100 tons. An elaborate working-out of the results of tests on the heavy gradients of the railway followed. The efficiencies arrived at are given in the following table:—

	Efficiency of Electrica Equipments.	"Drivers-to-Drawbar" Efficiency.	"Pantograph-Drawbar" Efficiency of Locomotives.
	Per Cent.	Per Cent.	Per Cent.
Westbound trip of 3,700-ton train of loaded ore cars from Rocker to East Anaconda at a schedule speed of 20 miles per hour	84·0	97·0	81·5
Eastbound trip of 1,190-ton train of empty ore cars from East Anaconda to Rocker at a speed of 20 miles per hour ...	83·3	95·0	79·2
7-mile trip up Smelter Hill with two 72-ton locomotives hauling 1,316 tons of loaded ore cars, the total train weight being 1,460 tons	83·0	92·8	77·0

The increase in the weight of the trains has, for a given quantity of ore, permitted a decrease in the number of trains per day by 25 per cent. The running time has been decreased, and the hours worked by engine crews, as compared with the steam days, have been lowered by 29 per cent. Though the rate of wages remains the same, the expenditure for wages for engine crews per locomotive mile has fallen from 6·6d. to 3·2d. Owing to the greater speed, less delays, and consequent great reduction in overtime, there has been a saving in trainmen's wages of 21 per cent. The total locomotive expenditure (including maintenance) per electric locomotive mile is 15·1d., compared with 37·5d. per steam locomotive mile. From a variety of figures the author reached the conclusion that the savings, as compared with steam locomotive operation, will within seven years of the inauguration of electric

Digitized by Google

operation, i.e., by the year 1920, have liquidated the capital expenditure of £300,000 incurred in the years 1913, 1914, and 1915 for the electrification of 114 miles of single track.

In describing the sub-station machinery, Mr. Hobart mentioned that only two sub-stations are required for the railway, as it is worked by direct current at a pressure of 2,400 volts. If 600-volt current were used, at least six sub-stations would be necessary. The distance between the two sub-stations is 26 miles.

Chicago, Milwaukee, and St. Paul Railway.

The lecture went on to describe the electrification of the 440-mile section (comprising 650 miles of single track) of the Chicago, Milwaukee, and St. Paul Railway, from Harlowton, in Montana, to Avery, in Idaho. The equipment is now being installed, 113 miles being completed. The railway company pay to the hydro-electric power company 0·26d. per kilowatt-hour for the electricity required. There are 14 sub-stations in all, from 18 to 43 miles apart. The working pressure for the railway is 3,000 volts, direct current. The locomotives have a continuous rating of 3,020 H.P., and weigh 250 tons each. One locomotive is 40 per cent. more powerful than two 72-ton Butte locomotives. The heaviest duty is drawing a load of 2,230 tons over a distance of 49 miles with a ruling gradient of 1 per cent. at a speed if 16½ miles per hour The cost for power for this work is put at 43d. per train-mile. With a steam locomotive the speed would be only half the above, and the cost for coal (at 12s. per ton) would be 58d. per train-mile. It will, for the purposes of a rough survey, be assumed that the average consumption of electricity and coal per locomotive-mile will, taken over the year, be only one-third of the amounts estimated for the 49 mile run.

While large Mallet locomotives can be bought for a matter of £24 per British ton, electric locomotives of the type under discussion cost fully three times as much, say at least £80 per ton. On the other hand, the repairs of a 330-ton Mallet amount to at least 12d. per mile, as against not over 5·5d. per mile for the 250-ton electric locomotive. If we credit both locomotives with a 15-year life, crediting the electric locomotive with 35,000 miles per annum and the steam locomotive with 25,000 miles per annum, and debiting both locomotives with 7d. per mile for wages of crew, the account stands :—

	Annual Outlay in Pounds Sterling.	
	Per 250-Ton Electric Locomotive.	Per 330-Ton Mallet Locomotive.
	£	£
I. Fuel and power	2,080	2,020
II. Wages of locomotive crews	1,020	730
III. Repairs of locomotive	810	1,250
IV. Interest (5 per cent.), taxes and insurance (3 per cent.), and amortisation (4·6 per cent.)...	2,400	950
Total of I + II + III + IV	£6,310	£4,950
Do. per locomotive-mile	43·3d.	47·5d.

From the above study, which is based on equal weights of train hauled, the saving in favour of the electric locomotive is of inconsiderable amount. In practice, however, advantage is taken of the inherent ability of hauling heavier trains with electric locomotives and at higher speeds. Indeed, the Mallets actually employed on the Chicago, Milwaukee and St. Paul Railway are much smaller than that on which the above illustration is based, and cannot, even at their lower speed, handle the service for which the electric locomotives are adequate.

In discussing the saving of electrical energy by regenerative control as used on this railway with its heavy gradients, the author pointed out that a further and a main consideration was the less wear of the wheels, brake shoes, and brake rigging. The speed down hill can also be greater. With modern methods of intensive ventilation of motors, regenerative-control equipments can be built with but moderate increase in weight, and still operate within approved temperature limits, notwithstanding the performance of the double function of motoring and generating. For a dense traffic regenerative control presents still further advantages.

Norfolk and Western Railway.

The lecturer next dealt with the electrification of 29 miles of the Norfolk and Western Railway from Vivian to Bluefield, West Virginia (which was described and illustrated in our issue of July 8 last). Electric operation began in May with twelve 240-ton locomotives of the split-phase type ; the working current is at a pressure of 11,000 volts with a periodicity of 25 cycles per second. The gradients are up to 2 per cent., and the traffic is chiefly coal. Trains weighing 2,900 tons each are transported by two locomotives, one pulling at the front and the other pushing at the rear. The speed is 14 miles per hour. Formerly it required three 240-ton Mallet engines, two pulling and one pushing, to make the trip at 7 miles per hour. Another important benefit has been the elimination of congestion at a tunnel where the line is only single-track.

Increasing Train Weights.

An important feature in the adoption of electric traction for heavy freight service was next discussed. Reference was made at some length to the efforts which railway companies in America have been making to increase the ratio of ton-mileage to train-mileage. This has been done by increasing the length and weight of trains and by seeing that they are filled before starting. It appears that during the last 14 years the ratio of ton-miles to train-miles for freight traffic per annum has increased on the average over all United States railways by no less than 68 per cent. Put otherwise, there was an increase of only 22 per cent. in the annual train mileage of freight traffic during the 14 years, but there was an increase of 104 per cent. in the annual ton-mileage. Great economies, especially for long hauls, must have resulted. Thus we have the inevitability of the rapid introduction of the electric locomotive in the further pursuance of this policy. While the steam locomotive has increased in twelve years by 50 per cent., in the feature of the average tractive effort of which it is capable, there has been no notable increase in the speed of freight locomotives. The electric freight locomotive provides any tractive effort permitted by the draft rigging, and also provides any increase in speed permitted by curves, and strength of freight cars and permanent way. The heaviest freight trains may, with electric locomotives, be propelled over heavy grades at twice the speed possible with steam locomotives.

New York Central Locomotives.

The author proceeded to give a description of the "1913" type of passenger train electric locomotive in use on the New York Central Railway. It uses 600-volt direct-current, weighs 115 tons, has a continuous rating of 2,000 H.P., and has a tractive effort of 13,840 lb. at 54½ miles per hour. Each locomotive hauls, at 60 miles per hour, a train weighing 1,100 tons. Owing to the absence of gearing, the efficiency of the electric equipment is exceptionally high, the motor efficiency, for a speed of 48 miles per hour, being 91 per cent.

Single-Phase v. Direct Current.

The following highly interesting table was next submitted. It gives data of the growth in the United States of single-phase and high-pressure direct-current electric railways during the last nine years.

Total Mileage of Single-Track Operating and Under Construction.

Year.	Single-Phase.	High-Pressure Direct Current.		
		1,200 and 1,500 Volts.	2,400 and 3,000 Volts.	Total for High-pressure Direct Current.
	Miles.	Miles.	Miles.	Miles.
1906	650	...	...	...
1907	1,040	...	...	...
1908	1,130	...	...	...
1909	960*	...	...	...
1910	990*	600	...	600
1911	1,040*	1,100	...	1,100
1912	1,040*	1,600	100	1,700
1913	940*	2,200	200	2,400
1914	1,340	2,750	450	3,200
1915	1,490	2,810	910	3,720

* The falling off in increase in single-phase mileage during 1909 to 1913 was partly due to changing over eight roads (aggregating over 300 miles of single track) from single-phase to direct current.

The author is satisfied that the high-pressure direct-current system is so distinctly superior in essential respects as ultimately to ensure its general use on main line railways, in preference to the single-phase system or any of its modifications.

Owing to the lower "drivers-to-drawbar" efficiency and the lower efficiency of the electrical equipment of single-phase locomotives, a given output from the drawbar will (taking into consideration all the varieties of traffic on a railway) require so much greater consumption of electricity by the locomotives as to fully offset any economies in sub-stations and distribution system. This conclusion concerning the relative consumption of the two types simply refers to one of the items entering into a comprehensive comparison. Amongst other matters requiring consideration are the relative initial costs of locomotives of equal capabilities of the two types, the relative outlays for repairs, and the relative reliability.

Mr. Hobart proceeded to quote arguments for and against each system, and to maintain the superiority of the direct-current method. He also entered into an elaborate comparison of costs of electricity delivered at the locomotive by the various methods, to show that there was very little difference. This left the single-phase systems handicapped by the greater inherent cost of single-phase locomotives.

The conclusions of the paper are to the effect that :—1st, we are on the eve of the extensive employment of electric locomotives on railroads at present operated with steam locomotives ; 2nd, that the direct-current system is the most appropriate ; and 3rd, that direct-current locomotives for use from high-pressure contact conductors are now a thoroughly demonstrated success.

Digitized by Google

LONDON TRAFFIC IN 1913.*

By Sir Albert Stanley
(Managing Director of the Allied Transit Companies of London).

INTRODUCTORY.

London is the largest aggregation of population in the world which looks to a common centre of civic life. It is only possible for such an aggregation to occur where there are adequate traffic facilities. The traffic facilities link up and bind together the wide-spread areas over which the population is scattered to make its homes. Not only must these be adequate, but they must afford a public service efficient in point of time occupied for the journey and economical in point of charge for the fare. These are the two factors that control the growth.

To secure a healthful standard of life a population should occupy large tracts of land, so that the buildings may be interspersed with pleasant spaces of country. To ensure an active and progressive life a population must be brought closely together for the exchange and sharpening of thought and the sharing of a common weal. The realisation of both these essential conditions depends upon the traffic system. It therefore should rank very high among public services.

I. THE SIZE OF LONDON.

The Central Area.—At the heart of London are the ancient cities of London proper and of Westminster. The area they occupy is only small, being a square mile for the one and some four square miles for the other, and in this extent are included the Royal Parks, about a square mile in themselves. Except for these parks, these areas are almost wholly built over. Yet their permanent population is only small. In the City of London it amounts to 19,657 persons, or 29 to the acre ; and in Westminster, chiefly congregated in blocks of residential flats, to 160,261 persons, or, together, 179,918, giving a density of 56 persons to the acre. Their day population, however, far exceeds their night population. For the City of London this has been ascertained by a special census, and was found to amount to 364,061 persons, or an influx of 344,404. For the City of Westminster no corresponding figure is available, but as the proportion must be somewhat similar, for the business section at least, the influx must, in this case, approach a million folks daily.

The Administrative County.—Around this core lies the administrative county of London, consisting of 27 metropolitan boroughs, with an added area of 112 square miles. Certain districts in the south-east corner of this area are only ill-developed, otherwise the whole of it is fully built over or dedicated to the public use. The population numbers 4,341,767, giving a density of just over 60 persons per acre on the average. Upon analysis this average is found to be made up from densities varying from 170 to the acre in Southwark, Shoreditch, and Bethnal Green, to 37 to the acre in Hampstead, due to the liberal provision of open space, 25 to the acre in Greenwich, 23 in Lewisham, and 15 in Woolwich, these being the south-eastern districts to which reference has just been made.

Greater London.—Then around the County of London lies a further ring comprising nine municipal boroughs, once small independent towns, and 62 urban districts, slowly growing round them and building them in, with parts, too, of some 14 rural districts. These, added to London County, constitute what is known as Greater London. The area of this ring is 576 square miles, and the population 2,729,673, giving a density of about 7½ persons per acre, varying downwards from a density of 62 in the borough of West Ham to densities of less than 1 person per acre in the rural districts. Summing up the figures to this point, Greater London comprises 693 square miles of country and a total population of 7,251,358 persons, with an average density of 16½ persons to the acre.

The Outer Suburban Ring.—Out and beyond this again is a population clustering round the stations of the railways running out from London in long lines, yet looking towards London for its work and interests, grouped together and known as the outer suburban ring. This has an area of 2,115 square miles and a population of 1,219,788 persons, or less than 1 to the acre. It is therefore merely sparsely populated from the point of view of the average, but the inhabitants are drawn up in little local centres, such as the townships of St. Albans with 18 to the acre, of Gravesend with 22, Rickmansworth with 11. Adding the figures for this part on to Greater London, the grand total of the persons centred on London, or affected by its existence, amounts to 8,471,146.

II. TRAFFIC FACILITIES IN LONDON.

It is not easy to give a picture of the traffic facilities of London that will enable a stranger to realise the extent or effectiveness of them.

Railway Stations.—As to the railways, the most useful index is the number of their stations. In the central area, the cities of London and Westminster, there are 38 separate underground s ations upon the local urban railways. In the administrative county of London there are 147 separate stations, not counting twice the stations which serve two or more underground lines, and upon the whole local urban system of railways there are 180 stations in all, showing that 33 lie outside the county. This system of railways consists of eight independent lines grouped together under two controls, one with six and a route mileage of 61½ miles, and one with two and a route mileage of 28 miles.

The main line or trunk railways serving London are nine in number with 16 terminal stations. These railways have 159 stations within the administrative county, 251 stations more within the boundaries of Greater London and still 164 more in the outer suburban ring, or altogether 574 stations. The most noticeable feature of the main line stations is the fact that all the terminals are detached and, with the exception of Charing Cross, not located at a really immediate traffic centre. This feature is of some consequence in the consideration of the problems arising out of the operation of London traffic. Each main line railway is in the hands of a separate Company (leaving over some short connecting lines held by other separate companies but under the joint control of the main line railways interested in their traffic). There are no agreements between these companies affecting the passenger traffic of London, so that each is free to pursue its own policy in this respect.

Tramway Routes.—The tramway, or street railway, system is practically excluded from the central area, for reasons of convenience based on the unsuitability of the narrow thoroughfares of the City and on the congested character of the street traffic in the important thoroughfares of the west end. In this central area there are only 2½ miles of tramway route.

The tramway authority for London County is the County Council. This authority owns and operates 145 miles of tramway, roughly divided into two systems, one north of the Thames and one, the larger of the two, south of the Thames. These systems are connected by a single route across the central area, built in subway, and only capable of being operated by single deck cars.

Outside the London County there are various authorities, and they may be divided into two classes :—First, 10 local authorities owning and operating between them 78 miles of tramways, and three private companies, acting as licensees for the local authorities, owning and operating 123 miles of tramways. All these tramways are in Greater London, and there are no tramways in the outer suburban ring that enter London. The interurban express tramway is not known. The best index to the traffic carried by all these tramways is the number of passenger cars which they own. It is 2,780. The size of a tramcar varies from 36 seats to 78 seats, but the most usual size will average 74 seats.

Motor Omnibuses.—Lastly there is the motor-omnibus industry. This has spread a network of routes all over the area covered by Greater London and to parts beyond in the outer suburban ring. It reaches points distant from Charing Cross, the accepted centre, such as Reigate on the south, 22½ miles ; Maidenhead on the west, 31½ miles; St. Albans on the north, 22 miles ; and Romford on the east, 14½ miles, with regular daily services. The maximum extension which it has reached up to date comprises 551 miles of roadway worked by 127 routes, or services, on weekdays, and 609 miles of roadway worked by 122 routes on Sundays. The operation of the system is practically under one control, although the ownership is divided among eight companies. The number of motor-omnibuses outside this control is negligible, being 18 in number, owned by three separate companies. The number controlled was, in July last, 3,525 total stock, with 3,477 working on Whit-Monday, 1914, the day of maximum movement. A motor-bus seats 34 passengers, 16 inside and 18 on the top.

With the outbreak of war the fleet of onnibuses has been broken in upon to perform services of a strange kind, as supply wagons, ambulances, gun-platforms, ammunition wagons, as well as the carriage of troops, so that the present situation is far from normal.

III. THE CONTROL AND REGULATION OF LONDON TRAFFIC.

Not only is the ownership of the traffic facilities in diverse hands, but the control, as well as the regulation of them, is similarly diverse. It is necessary to consider the three types separately.

The Construction of Railways.—First, as to railways, these are built almost universally under a private Act of Parliament, for only by this means can the privileges and powers enjoyed by a railway company be obtained. The procedure through which a private bill has to pass before becoming an Act enables all parties affected or interested to appear and oppose it before the committees constituted of members of each House of Parliament in turn, Lords and Commons, The grounds of opposition are very wide. Competition, the disturbance of property or other private rights, the seeking of conditions, limitations, or restrictions as to the methods of working or conducting the business—always assumed to be in the public interest—and the policy pursued by public bodies under their enabling statutes as related to the project, are all good grounds. In the result a very considerable expense attaches to the inception of a railway. In the

*A paper presented at a meeting of the International Engineering Congress, held a San Francisco, September 20-25, 1915, and briefly summarised in The Tramway and Railway World of November 18, 1915. As there promised, we now reprint the paper in full.

Digitized by Google

result again many bargains are made in respect of the proposed railway which were not within the original intentions of the promoters, and many schemes are put forward not because they are necessarily the best, but because they are most likely to successfully run the gauntlet of opposition.

The chief defect of the main line railway system of London is due to a policy which withheld all the main line railways from entering the central area. The chief defect of the underground system of local railways is the piecemeal manner in which they have been designed by small and separate companies, and the lack of any powers of review left to the Legislature, for the Legislature may only accept, or reject, any particular Bill presented to it. Amendments cannot go to the substance of the proposal. Following upon this dispersion of interests, there have been jealousies which are illustrated by distinct and adjoining stations at many traffic centres, representing double costs, and involving only half as convenient interchange arrangements. And, as a last defect, the stations are often upon sites which are second best only, whereas the effectiveness of an underground and invisible system of railways is almost wholly dependent on evidence of it at the critical traffic point.

The possibility of an underground system of deep-level tube railways for London is due to the existence of a thick bed of clay, impervious to moisture, stretching underneath it. The turning to full account of this possibility for railway construction is due to a provision of the Legislature which fixed the compensation payable to the owners of the surface for the right to run tubes underneath, provided that the depth exceeded 40 feet below the surface. Under public streets or property the price is fixed at a shilling per foot run. Under private property the price is fixed at a sovereign per foot run. By other provisions of this period protection is given against claims for damage and vibration arising out of the construction and working of the railway. It is under such special favourable provisions as these that London has been able to acquire the unique system of railways which now serves it.

The Construction of Tramways.—Tramways are built under Acts of Parliament in the same manner as railways. An alternative procedure, by way of provisional order, is available, where the initial inquiry is by officials of a Government department (the Board of Trade), and is, on this account, of less costly character. A provisional order is subsequently confirmed by Act of Parliament as a matter of form. With a view to simplifying the procedure for the obtainment of traffic facilities, the Light Railways and Tramways Act of 1896 was passed, which set up a body of commissioners for the purpose of inquiring into and adjudicating upon schemes submitted to them. The order of the commissioners becomes effective as soon as it is confirmed by the Board of Trade, and, not requiring the sanction of Parliament, curtails both the risk and the expense. Although the procedure to secure a grant of tramways is thus made less expensive and much easier, there are quite different difficulties in the way of a complete and homogeneous system. While in the County of London the County Council is the sole authority entitled to construct and work tramways, and every private or other undertaker is excluded, the cities and municipal boroughs comprised within its limits have each a power of veto upon the construction of a tramway within their respective districts. Thus one can agree and one disagree, with the result of detachment of lines and the re-casting and truncation of schemes to avoid prohibited areas. The door is also opened for negotiations on many questions, such as the type of construction, the services to be provided, the fares to be charged, the upkeep of the street occupied, and, particularly common and burdensome, street widenings and improvements. Not that this veto has not proved beneficial in keeping open large and important streets in the west of London of peculiarly heavy traffic, in checking a prodigal development of tramways of a little useful kind, and in preventing the occupation of unsuitable streets, which frequently occur in old-built places. Outside the London County, both county councils, municipal boroughs, and urban and rural districts are capable of becoming tramway authorities. Only where they waive their prior claim may the private undertaker come in, and in this case purchase clauses, enabling the local authority to take over the tramways, are always included.

Another special type of opposition is that of the frontagers on a route. These are afforded an opportunity of exercising a veto under certain conditions and always of opposing individually.

As a consequence of vesting the power to build and work tramways in the numerous local authorities, tramways are under the control of many hands, just as railways, and not until quite recently, when the financial position of tramways was becoming precarious, have the local authorities concerted together to link up their systems and provide through services of cars and continuous schemes of fares.

Both railways and tramways are subject to provisions designed to secure the safety of the public and to limit the burden of charge which the public may be asked to bear.

The Licensing of Motor-Omnibuses.—The motor-omnibus uses the ordinary streets of the cities and towns just as it finds them. It can ask for no privileged position, but must take its luck with any other competing form of traffic without protection. Therefore there is no need or obligation on it to seek powers or rights from the Government, local or central. None the less the central Government has seen fit to establish certain preliminary conditions with which a motor-omnibus must comply before it is allowed to work on the streets, and has given a discretion to the local authorities as to whether motor-omnibuses shall be allowed to run within their district or not. These measures are rendered effective by requiring a motor-omnibus to take out an annual license. In London the complete effect of these measures is diminished by the fact that in the metropolitan police area, which corresponds closely with Greater London, the licensing authority for the whole is the Chief Commissioner of Police, and he is not vested with a discretionary power like the local authority, but must license the motor-omnibus as soon as the requisite conditions are duly met. These conditions govern the size, capacity, and dimensions of the vehicle, the speed, the equipment, and appearance of the body, and the efficiency of the engine. They are designed to secure that not less than a certain minimum of comfort is afforded whilst a maximum of safety is assured, and to prevent nuisance arising from noise, smell, or dirt. Incidentally, the granting of licenses is a source of revenue, for sums amounting to £5 18s. per annum are payable in respect of each motor-omnibus licensed.

Outside the police area the discretionary power to grant licenses is being interpreted by the local authorities as a power to negotiate terms, though as yet only tentatively. There is increasing prospect of difficulties arising out of this, and already certain districts have refused licenses altogether, to the prejudice of their neighbours. To work the present scheme of routes in London, licenses have had to be taken up in 16 districts.

Inspection and Supervision.—When a railway or a tramway is completed and opened for traffic, the Board of Trade has a continuing oversight over certain aspects of its operations and business, chiefly with a view to seeing that the terms under which it came into existence are observed, but also with a view to establishing a high standard of safety, a uniform treatment of the public, and a fair dealing with the staff employed. In the same way, the Commissioner of Police has a supervision over those aspects of the motor-omnibus industry which are governed by the conditions laid down for licensing, coupled, in his case, with the very effective power of suspending the license, and so removing the motor-omnibus from work, where he has reasons to be dissatisfied. But all this is rather incidental to the working of the traffic of London than essential to the consideration of its problems. There is no power vested in anyone to keep the whole traffic situation under review, or to treat of its real needs and conflicts.

IV. SOME CONSEQUENCES OF THE UNCO-ORDINATED CHARACTER OF TRAFFIC FACILITIES.

The consequences which flow from the detachment and division of ownership, indicated in the preceding section, and the lack of co-ordination and control among the public authorities, group themselves into three problems :—

(1) The isolation and lack of correlation between the urban and trunk railway systems.
(2) The conflict between tramways and motor-omnibuses.
(3) The exposed position of motor-omnibuses, and the conditions attaching to a franchise.

In the Relations of Urban and Trunk Railway Systems.—The distribution of the main line termini on the borders of the central area has already been adverted to in this article. The volume of traffic to and from these stations from and to stations within 30 miles of Charing Cross, the assumed centre point of London, is estimated at 365 millions of passengers in the year. Practically all these people have to rely upon other means of transit, such as urban railways, tramways, or motor-omnibuses, for the completion of their journey. As the inward and outward flow of this traffic is confined largely within a limited time, the problem of congestion grows acute, for the auxiliary modes of transit, with the exception of certain motor-omnibuses, do not start at the main line termini with their services, but pass them on journeys from and to other districts of London where they have already obtained a load. In addition, the accommodation at the termini themselves for local services tends to press upon the accommodation for trunk services, and extensive and extravagant schemes of enlargement ensue. For in addition to the high price of land in suitable sites, the enlargement of a station entails a widening of the approach roads over a considerable distance, which must either be in tunnel or on an elevated structure to avoid grade crossings in the streets.

An alternative method of dealing with this problem is the coupling up of the urban or underground railways, at some point beyond their zone of heavy traffic, with the main line railways, and the working of through services of trains within the limits of the flow of the suburban traffic of London. Towards this solution, various steps have been taken. For example, the Metropolitan Railway owns, jointly with the Great Central Railway, 22½ miles of line running out from Harrow, and terminating at a distance from London of about 40 miles. The District Railway owns extension lines to points such as Uxbridge, 20½ miles ; Harrow, 14 miles ; and Hounslow, 13¾ miles out of London, to which points it projects some of its principal services of trains. Then the District Railway runs over certain isolated sections of the London and South Western Railway to Richmond, 10 miles, and Wimbledon, 9 miles, and is jointly interested with the Midland Railway (Tilbury section) in the running of trains to Barking, 9¾ miles out of London, and to Southend, 38 miles away. Most of these arrangements are of long standing, and arose at a time

Digitized by Google

when the distinction between urban and trunk railways was not drawn, and in any case antedate the appearance of the tube railways. But the first real step in the direction of a modern solution on these lines was the agreement between the London Electric Railway and the London and North Western Railway, by which some two extra miles of tube railway were built for the purpose of linking the Baker Street and Waterloo line up to the suburban tracks of the North Western Railway running out to Watford, a distance of 19 miles. This arrangement is coincident with the adoption of electric traction by this main line railway for its suburban traffic. The advantages of such an arrangement are many. The trunk railway comes into possession of a distribution system for its traffic, clear of a large central terminal ; the urban railway acquires feeder connections into the territory outside London, waiting to be developed ; the public gain almost invariably in more convenient journeys and reduced rates of fare. Now that the initial step has been taken, other railway companies are seriously considering it, and there is reason for strong hopes that the whole network of railways of all kinds serving London will soon be knit together into a coherent and easily used pattern. The disadvantages of such an arrangement should not be wholly overlooked. They arise from the restricted size of the rolling stock used in the underground tunnels. The standard diameter of the running tunnel is 11 ft. 8 in. The cars seat 48 passengers. The diameter of the wheels is 30 in., so that the car floor is lower than that of standard main line coaches by 24 in., and is out of relation to the heights of the main line station platforms. Only in the case of one urban line was this factor brought into active consideration. This was in the case of the Great Northern and City Railway, a short length of line of 3½ miles, where the running tunnel was constructed to a diameter of 16 ft.

In the Conflict of Tramways and Motor-Omnibuses.—The second great problem is concerned with the conflict of tramways and motor-omnibuses. This conflict has taken on a political character, which makes it more severe. The tramways either belong now, or will eventually belong, to the local authorities. Not any of the local authorities of London are empowered to work motor-omnibuses, and the whole motor-omnibus industry is in the hands of privately-owned companies. Both use the same streets, and compete to some extent for the same traffic. The motor-omnibus has since 1912 proved to be a formidable competitor, and the financial condition of the tramways has become insecure. The traffic situation is illustrated in the following table :—

L.C.C. TRAMWAYS.

Year.	No. of Passengers.	Per cent.	Average Receipts.	Proportionate share of whole.
			d.	
1911	516,092,489	—	1·04	60·2
1912	501,102,149	2·9 (dec.)	1·03	50·4
1913	522,952,600	1·3 (inc.) on 1911	1·01	41·8

L.G.O. AND ASSOCIATED MOTOR-OMNIBUSES.

Year.	No. of Passengers.	Per cent.	Average Receipts.	Proportionate share of whole.
			d.	
1911	340,669,411	—	1·32	38·8
1912	492,858,934	44·7 (inc.)	1·32	49·6
1913	705,156,724	107·0 (inc.) on 1911	1·33	58·2

For the first half of the year 1914 the motor-omnibuses carried 387,926,979 passengers, again a substantial increase on the preceding year. A tramcar being confined to rails, and involving much capital expenditure for construction, is obliged to follow the main arteries of traffic. The motor-omnibus, on the other hand, is free of every street which is capable of traffic. It can therefore develop in the areas adjoining the main roads. It can afford to pioneer in areas that could not afford a tramcar. It is adapted to the affording of cross and interchange connections. Not running on fixed rails, the omnibus adjusts itself easily to the conditions of traffic prevailing in a street. It does not create the blockade which congestion always conduces in a tramway. It falls in with the moving stream on either side of the road, and does not monopolise the centre. This is an important merit in the central thoroughfares of a city.

On the other hand, not running on rails, but using the ordinary surface of the road, the omnibus is subject to limitation as to weight. The total laden weight of a motor-omnibus must not exceed 6 tons. This weight limits the number of passengers that can be carried to 34. An omnibus is therefore a small traffic unit, less adapted to the carriage of heavy peak loads than to the carriage of the constant pick-up traffic of the streets. But experience shows that a quick succession of small units proves to be very efficient, and, added to the wide dispersal over many routes which is possible to omnibuses, this form of transit is capable of undertaking a vast deal of work, and of tackling a really heavy traffic density. To show the relative effectiveness of the two types of vehicle, the average load of a tramcar with 74 seats is 10½ passengers, and of an omnibus with 34 seats is 8 passengers. The relative efficiency of the omnibus, measured in percentage of seats occupied to seats offered is therefore almost twice as great as that of the tramcar.

[NOTE.—The distance the passenger is carried is not brought into this calculation, but as it must be almost equal for the two types of vehicle, the inference drawn from the figures is a correct one.]

The scheme of motor-omnibus routes worked in London does not contain a single instance where the route merely parallels a tramway route. In every instance the omnibus gives a greater extension or a new connection to that given by the tramways with which it comes into contact. The tramway is laid out on a territorial basis, and the omnibus, escaping from the artificial lines which form the boundaries of districts, is able to consider a route more purely from a traffic point of view.

The tramway, occupying a portion of roadway almost exclusively, is burdened with responsibilities in the way of repair and maintenance of the road surface so occupied. Again, a tramway is treated as an owner of property, and is rateable on its profits, as on an assumed rental, towards local and public purposes. From both these burdens the omnibus is exempt. All it has to pay for its user of the streets are the license fees. Latterly there has been an outcry that the omnibuses were damaging the road surfaces, and this has been made the basis of attempts, partially successful outside London, to specifically tax the omnibuses for the user of the roads. The central Government has had to take account of this outcry, and is proposing to set up a special committee to inquire into all the aspects of the question.

Experience so far has shown that on roads with foundations made sufficiently strong to carry the weight of an omnibus, and with a rigid surface such as that given by wood blocks or the hardest asphaltic macadam, the wear occasioned by the omnibus is less than the wear occasioned by other types of vehicle, and eminently less than that occasioned by horsed traffic. As a general principle it might be laid down that, having regard to its importance to the life and health of a district, it were undesirable to put a tax on traffic facilities at all, but that rather everything should be done to secure them on as cheap a basis to the public as it is possible.

The Exposed Position of the Motor-Omnibus Industry.—The third problem is not a pressing one at the moment, but it has arisen in an acute form in the past, and that is the existence of two or more powerful companies competing with each other for the motor-omnibus traffic. In the year 1908 there were three companies working omnibuses, both motor and horse, in London, whose relative size is shown in the following table. Only the motor-omnibus column counts as really effective, and in this class of vehicle all three were more or less equal.

	Horsed Omnibuses.	Motor Omnibuses.	Total.
London General Omnibus Company...	991	233	1224
London Road Car Company	222	195	417
Vanguard Company	—	242	242

In this year, 1908, the competition was so intense that all the companies were working at a loss. Services were duplicated, racing took place in the streets, and accidents were frequent. Just as the state of affairs was becoming a public question, an agreement for amalgamation was reached, and the London General Omnibus Company absorbed the other two. In 1911 the Great Eastern Company, which had been constituted in 1906, was also absorbed.

There is no existing means by which anyone wishing to work an omnibus within the metropolitan police area, or, in effect, Greater London, can be stopped from doing so, providing the vehicle he proposes to work with complies with the conditions and tests laid down by the police. Therefore the amalgamation in the year 1908 did not close the door to a repetition of the evil situation.

The policy of a small owner differs fundamentally from that of a large proprietor. The small owner's costs are relatively larger, and he demands therefore a higher rate of earning to meet them. To obtain this he requires to work his 'buses on a short central section of route where there is a preponderance of traffic and a greater profit. When several small owners adopt the same policy, the result is not good from a public point of view. On the other hand, the large proprietor is bound, in his own interests, to cover as wide an area as possible, to seek new openings, and to establish himself securely in the task of meeting the public requirements. The London General Omnibus Company has always had routes since 1912, when the present management entered into control, which were unremunerative.

From time to time small fleets of motor-omnibuses were placed on the streets, chiefly by manufacturers through operating companies formed under their control. In this way some thousand motor vehicles had accumulated about this year, 1912, owned and controlled by seven separate companies. With all the seven small companies the London General Omnibus Company has entered into agreements by which it, in effect, pools earnings with them, and takes up the oversight of their traffic working. Only 18 motor-omnibuses, owned by three companies of quite recent origin, are now outside this control at this date. The problem is therefore quiescent. Rumours of

Digitized by Google

new companies are frequent, and the fact that they seldom realise is due to the growing strength of the associated companies in possession. The only real remedy would be the granting of a franchise to the existing companies, and then the problem resolves itself into one of terms.

A franchise means a monopoly, and where there is a monopoly it is reasonable to look for guarantees of the interests of the public. It would be reasonable to expect a limitation of the amounts to be charged for fares, and in London, on the analogy of railways and tramways, special cheap facilities for workmen's traffic, a requirement of an adequate service, a progressive improvement in the vehicles and equipment, and, lastly, some co-operation with the railways and tramways already occupying privileged positions.

Some of these matters are capable of expression at once in the clauses of an agreement, but others, and the equally essential ones, are matters of judgment and experience. The crux of the problem is—Who is to be the final arbiter in matters of this sort? Is the company who may own the franchise, or is the local authority who is the representative of the public?

The local authority is vested with the care of the public interests, and is entitled to see that the public transit service is adequately maintained to the most modern standard of requirements at fares as low as may be remunerative. In the execution of these duties the local authority may take a share in the provision of transit facilities, but on this account it must clearly put itself out of court as arbiter. It must on all counts occupy the position of prosecutor.

The real problem, then, behind all the other problems, which arises from the multiplicity of interests and ownerships, the division of responsibility for the control and regulation, the lack of any system of review, is the establishment of an independent Traffic Board. This was the recommendation of the Royal Commission on London Traffic in 1907. Under this recommendation it was to consist of a few expert members, and was to be armed with judicial powers of a wide and effective order. So far only a statistical and recording section of the Board of Trade has been set up. The other alternative is more difficult. If the local authority were to divest itself of its power to interfere actively in the traffic of London, it might be given a judicial power in this matter, subject only to some guarantees to the companies incurring the financial responsibilities for the task if the decisions of the local authorities proved to be inimical to the interests of those whose money was invested in the undertakings. Apart from the difficulty of undoing what is now done, there is a special difficulty in the number of local authorities concerned, and whose co-operation for success would be requisite.

Some solution of this problem is urgently needed; meanwhile the effort made by the Underground Electric Railways Company of London, Limited, to work out a solution independently is worthy of note. This company first acquired an interest in the District Railway in 1903. Subsequently it took over from the promoters the rights to build the three deep level tube railways known as the London Electric Railway. This system was working complete in 1908. At this time it had also acquired control of a large tramway undertaking, the London United Tramways Company, Limited. In January, 1912, it took over the London General Omnibus Company, Limited, and has since then entered into agreements with practically all the other motor-omnibus companies working within the London area. In January, 1913, it extended its control over two other older deep-level tubes, the Central London and the City and South London Railways, and, as a last step, added to its interests two other large tramway undertakings. To-day it is responsible for the operation of 61½ route miles of electrically worked urban railway, 123 route miles of tramway, and practically all the motor-omnibuses of London. It has tended towards an ownership control, but as such it has no legal existence, no protection, and, equally, no special obligations. This only can be said, that it has always regarded first the public interest, and its record for the years of its existence is unimpeachable testimony as to this.

V. THE VOLUME OF LONDON TRAFFIC IN 1913.

In Relation to the Traffic Facilities.—The total passenger traffic of London in 1913 is estimated at 2,293,838,249 passengers. This total is shared almost equally between the three types of traffic facility—the railway, the tramway, and the motor-omnibus. The number of passengers carried on the local railways was 423,490,553, including under this head three sections of main line railways in London issuing separate annual reports and figures. This represents a traffic of 3,781,166 passengers for each mile of route, and 1,802,087 passengers for each station provided. In the year 1907 a return was made by all the main line railways for the month of October showing the traffic which they carried into their terminal stations in London from points distant within 30 miles. Based on these figures, the total number of passengers of a local character contributed by the main line railways is estimated at 365,190,972. This represents a traffic of 636,221 local passengers for each station provided. The total number of passengers carried by railways was 788,681,525, or 34 per cent. of the grand total.

The number of passengers carried on the London County Council Tramways was 522,952,640. The number carried by the tramways operated by other local authorities is estimated at 112,888,137. The number carried by privately owned and operated tramways was 164,159,223. The total number of tramway passengers was about 800,000,000, or 35 per cent. of the grand total. This represents a traffic of 2,312,139 passengers for each mile of route, or a traffic of 287,770 passengers for each car provided. The number of passengers carried on motor-omnibuses was 705,156,724, or 31 per cent. of the grand total. In 1913 the traffic represented 202,806 passengers for each motor-omnibus provided.

In Relation to the Population.—If the total population of 8,471,146 is applied to the figure of 2,293,838,249 total passengers, the average number of journeys per head of the population works out at 271 per annum. So high a figure as this is only of recent occurrence. The year 1906, which marks the commencement of electric traction on railways and the development of the motor-omnibus industry, marks also a turning point in the volume of traffic. In this year the journeys per head of the population were estimated at 164. The rate of increase over the eight intervening years is 65 per cent.

Further illustrations are available of the movement of traffic in London. For instance, at Golders Green Station, the terminus of the Hampstead line of the London Electric Railway, where the only means of direct access to the centre of London is by railway, the average number of journeys per head of the population is 260 per annum on this line alone. This is at a distance of just over six miles from Charing Cross. At the 1901 census the population of this district was 22,450 persons. The railway reached it in 1907. At the 1911 census the population was 38,806, or an increase of 73 per cent., almost all due to the last four years. Then at Wimbledon, where there are two railways, which form the only good means of reaching the centre, the journeys taken on one railway alone work out at 154 per head of the population served, or at something over 220 for both. This is at a distance of nine miles from Charing Cross. Then again at Sutton, which lies at a distance of 12 miles from Charing Cross, where by reason of the distance, the railway is the only practicable means of transit, the railway journeys per head of the population to and from London are as high as 170 per annum. Lastly at Southend, 38 miles from Charing Cross and the nearest seaside resort to London, there is a regular flow of business traffic to and from London of over 4,000 people in a day, which works out at 43 journeys per head of the population served per annum.

A converse illustration is the volume of the traffic moving in and out of the central area, the cities of London and Westminster. The available data on this aspect are confined to the passenger statistics of the local underground railways. Out of 423,490,553 passengers carried by them, 120,533,406, or 28 per cent., travelled to and from stations in the central area. If this proportion were to apply to other types of traffic facility, it would mean that over 642,000,000 people were carried in to and out of this area. Such an estimate confirms a previous estimate of the wide difference between the day and night population of this central area, and emphasises the manner in which the unity of London is created by, and depends upon, the traffic facilities.

VI. FLUCTUATIONS IN THE VOLUME OF TRAFFIC.

Of more importance to the various traffic undertakings is not so much the total traffic to be carried as the incidence of the traffic throughout the months of the year, the days of the week, the hours of the day, an evenly-distributed traffic being at once the most easily worked and most profitable.

The Course of the Year.—In considering the effectsof the seasons on London traffic, it is necessary to sharply distingui h between the underground, or railway, system and the surface, or tramway and motor-omnibus, system, for the weather characteristics of each stand in contra-distinction to each other. The seasons of fine warm weather bring about a transfer of passengers from the protected railway services to the open motor-omnibus and tramway services, just as surely as the seasons of cold, wet weather bring about the opposite transfer. The effect of this transfer is to reduce the average winter railway traffic by an eighth. The increase on the surface systems, strengthened by the larger volume of traffic which genial weather induces, is a sixth more than their winter level. This is the most predominant feature in the shift of traffic during the year. The only other marked feature is the drop occasioned by the holiday season of August and September. The trend of traffic month by month follows some such course as this.

January is a good month chiefly on account of pleasure traffic springing from the number of entertainments, pantomimes, and plays which crowd the Christmas festival and endure to about the close of the month, and from the after-season sales of big drapery and general stores.

February is a bad month, and for all the surface systems usually the worst of the year. March, April, and May are the months during which the railways slowly weaken and the surface systems slowly strengthen. These months are marked by public holidays at Easter and Whitsuntide, when traffics are especially heavy. The close of May, the month of June, and the beginning of July form the London season. June is the best traffic month of the year all round. July is less good, although the traffic is generally sustained up to the first Monday in August, which is another public holiday. At this point the holiday drop starts with great suddenness. Everyone goes out of town that can, and business and pleasure alike languish. August is the worst month of the year on the whole. On the railways, about

Digitized by Google

a quarter of the traffic vanishes; on the surface systems, only a tenth. It is less marked on the surface systems because of the development of country pleasure riding that has taken place in the last two years. The poorer classes of the population, who cannot afford to go away for holidays out of town, take their brief holidays in rides out into the surrounding country. This drop continues well into September, and as the traffic comes back again it falls to the railways, for this month and October are the months in which, vice versa, the surface systems weaken and the railway system strengthens. It is a more quick transition. November is a variable month, contingent on the weather. December closes the year with a good month, due to the extensive shopping and other preparations for Christmas.

The Course of the Week.—There is nothing sensational in the course of the traffic throughout the year, and the same may be said of the course of the traffic throughout the week. Setting aside days of extraordinarily inclement weather and days of extraordinarily heavy traffic, like the annual shows and feast days, the characteristics of the week are constant. Sunday has the least traffic of any day; on the railways only half and on the motor-omnibuses some four-fifths of that of an average weekday. Monday to Friday present little change. Wednesday and Thursday excel the other days because the mid-week shoppers' half-holiday of certain suburbs falls on one or other of these days, and mid-week distractions seem to come to vary the regular round of domesticities. Superstition militates against Friday's traffic. Saturday is the day of largest traffic, exceeding the average day by a tenth on the railways and a sixth on the motor-omnibuses. This is by reason of the addition of the pleasure traffic of a general half-holiday to the normal business traffic. The relative gains of motor-omnibus and railway indicate how much the surface systems enjoy the greater share of the pleasure riding. Throughout the week the variation in the traffic is fractional.

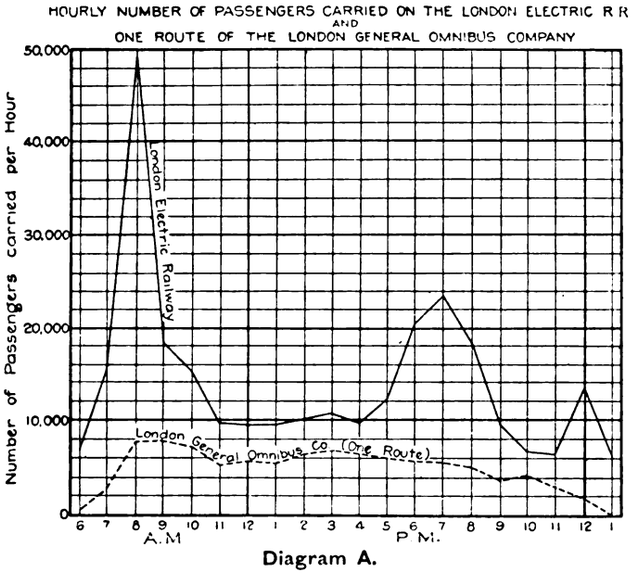


Diagram A.

A note may be added upon one satisfactory aspect of the Sunday traffic of the railways. It has been increased at a much faster rate than the weekday traffic. On the District Railway, largely as the result of advertisement, the Sunday increase over the last five years has been 25 per cent., as compared with an increase of 11 per cent. on weekdays.

The Course of the Day.—It is when the course of the day is considered that the variations become of substance and concern. At this stage the railways have to be taken separately as showing the widest divergence. Data of this sort are not available for the tramways, but it is presumed that their characteristics are similar to those of the railways. On the motor-omnibuses the divergence is never very great. A diagram illustrates the contrast. (A.)

On the railways and tramways the peak load of the morning is accentuated because of a class privilege which is deeply embedded in the traffic arrangements of London, and is consecrated by statutory enactment. This is the cheap workmen's return fare, which almost corresponds to the single journey fare at other times of the day. The outward journey must be commenced before 8 a.m. as a rule, but the return journey may be at any time of the day after noon. The wider limits of the return journey cause a better distribution of the traffic in the evening between 5 o'clock and 8 o'clock. The morning rush to business and the evening rush home have their slender counterparts in the evening rush to pleasure and the night-time rush home. The evening rush to pleasure is covered by the evening rush from business, but the night-time rush home, from 11 o'clock to 12 o'clock midnight, is clearly visible on the diagram.

The motor-omnibus, when operating in conjunction with other means of transit, has not a peak load. One reason is the absence of the workmen's return fare, which cuts it off from a fair share in the traffic before 8 o'clock in the morning. Another reason is the smallness of the units required to be filled with traffic, which allows of a closer adjustment to demands. A third reason is the special feature of motor-omnibus traffic, in that it consists of traffic casually picked up all day long, so long as there is traffic in the streets. The motor-omnibuses are always reasonably full throughout the day. At the time of peak load they are quite full. They cannot overcrowd like railways and tramways, for the terms of their license from the police forbid it. To-day, on account of the withdrawal of omnibuses for the war they are specially allowed to stand five passengers inside as a temporary measure.

It is in the variations of the day that the operating problem of accommodation arises, where the ratio runs from one to five. Yet for all this it is not an acute problem in London. The worst point for overcrowding on the railway system is at Whitechapel in the East End, and is almost wholly due to the peculiar workmen's privilege. A chart (B) shows how bad this is, and by way of comparison another chart (C) for the West End of the same railway, for the corresponding point of maximum traffic on that side, shows how good it is.

Much effort and many improvements have gone towards the securing of this result, and the problem has been kept within manageable proportions.

VII. IMPROVEMENTS IN RAILWAY CAPACITY.

Electric Traction and Automatic Signalling.—The District Railway commencing as a shallow steam railway and being converted to electric traction in 1905, first of any railway in London, has the longest and most interesting record of improvements and progress. The main section of this railway, over which all trains serving the central area must pass, extends from Mansion House Station on the east to west of Sloane Square Station on the west, a distance of four miles. It consists of two tracks, one for each direction. At points eastward of Mansion House Station, which has terminal facilities, it diverges into three separate branches, and at points westward of Sloane Square Station it diverges into six. From and to each of the six westward branches services of trains run through on to the main section. With trains converging at so many points, the problem of timing the trains in, to give a uniform interval at as many points as possible, is difficult in the first place; but even more difficult is the problem which arises fresh with every day's working of bringing the trains to the converging points at the correct moments amid all the little unevennesses and mischances which will occur whatever care is exercised.

Under steam conditions, the best result was a succession of 18 trains in the hour in each direction over this main section. Under electric conditions, but chiefly due to the substitution of a system of automatic signals giving shorter block sections in place of the old manual signals, the number of trains in the hour each way was raised to 25, varying from 24 to 27 with successive time tables in 1906-7.

In 1907 the need was felt for some increase in the service provided if the development of the traffic was to be encouraged. The change in motive power had not so far produced a corresponding change in the alertness and dispatch of the train and station staff. Experiments were made in the way of starting the trains from stations and in the way of securing a quicker rate of unloading and loading, and at the close of 1907 the number of trains reached 31 in the hour.

The year 1908 brought a reconsideration of all the branch services which went to piece together the total service on the main section, and, by a rearrangement of these services to avoid possible clashing and delays, the trains crept up to 35 in the hour. During this period the platforms throughout the line were reconstructed and lengthened to take eight cars as a maximum train length, and in the then physical state of the property it was not practicable to carry the frequency to any higher pitch.

The Elimination of Flat Junctions.—About the year 1910 a series of works was commenced having for its object the amelioration of the property and the raising of the standard of operation to that of the latest constructed railways. The first work was the re-designing of the Mansion House Station. This station consisted of two through tracks placed between two island platforms on the outside of which were two terminal tracks. To use a terminal track involved, either in entering or leaving, the blocking of the through tracks in both directions. As re-designed, it consists of a terminal track between the two through tracks, with a relief siding on the outside used for storage only, and by this means the blocking of both tracks is avoided in ordinary train working.

Concurrently with this alteration, and proceeding during the succeeding year, steps were taken to overlap the block sections throughout the main line, so that the distance between trains approaching stations was reduced to the minimum space required to ensure safety under the given working conditions. In November, 1911, the number of trains in the hour was 37 in each direction.

But the chief obstacle to progress was the existence of so many junctions on the flat where trains, crossing over from the branch to the main line, blocked the tracks in both directions. The policy of transforming the flat junctions into flying junctions where, by differences of level the tracks for one direction are carried over or under the tracks for the other direction, dates from the year 1910. In this year the junctions at Acton Town, an outlying point, were completed.

Digitized by Google

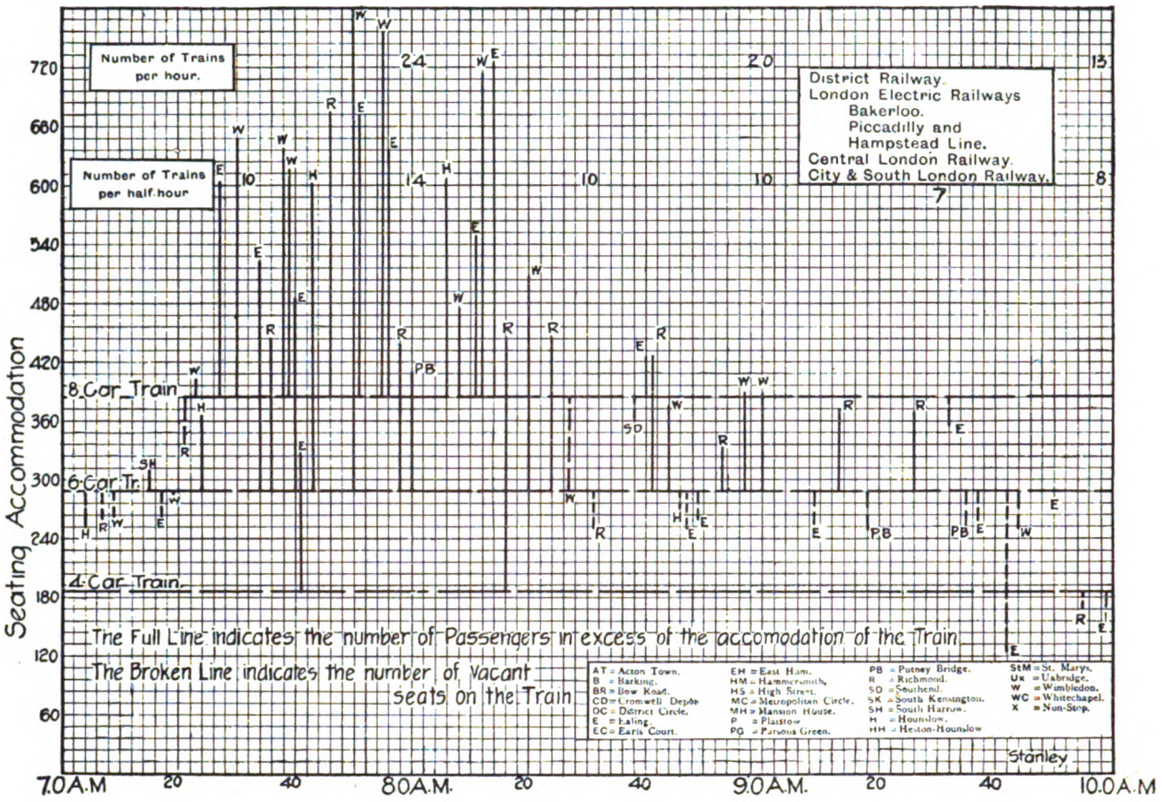


Diagram B.—Train Loading, taken at Whitechapel on the West Bound Road, June 20, 1914.

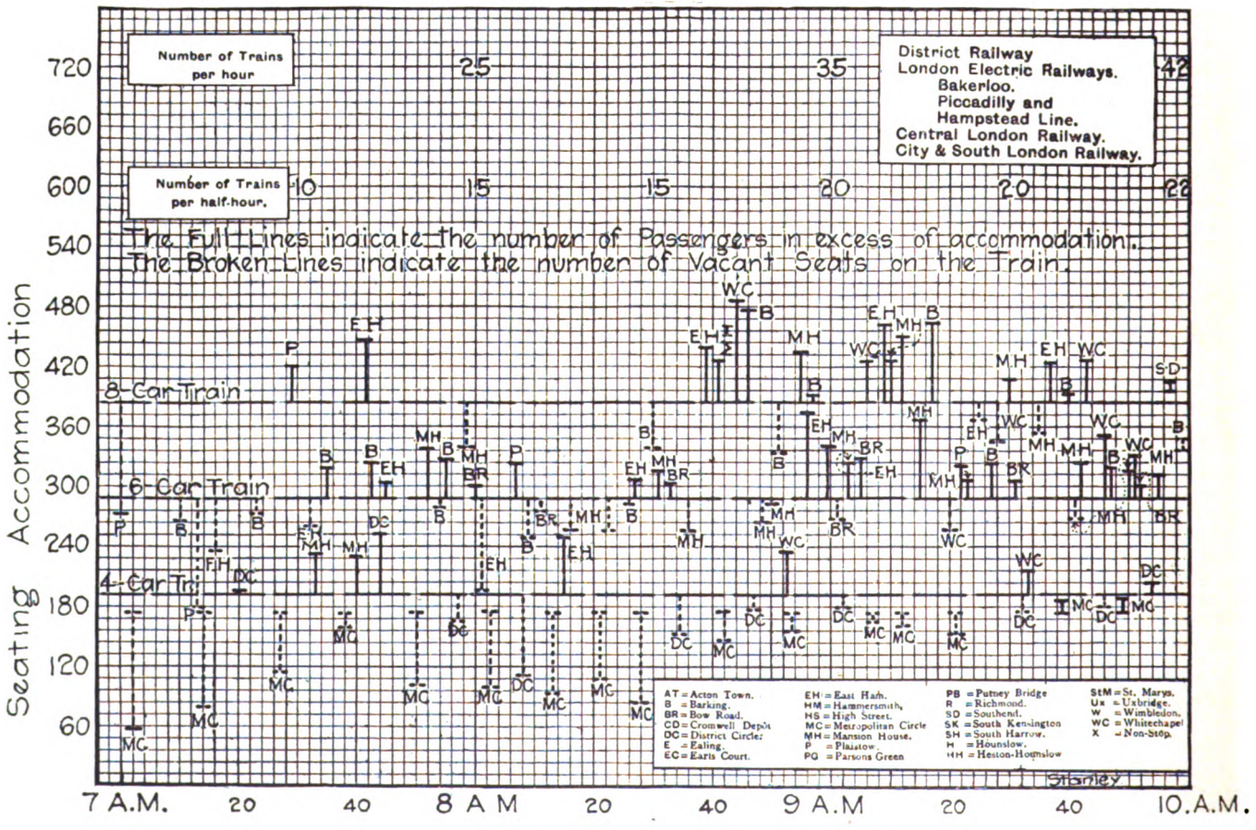


Diagram C.—Train Loading, taken at Sloan Square on the East Bound Road, March 9, 1914.

Digitized by Google

In 1911 the junctions for the Richmond line were similarly treated, and coupled with a doubling of the line to four tracks over a short length. The benefit of this was felt in the increase of the main line trains from 37 to 40 in the hour. In 1914 the junctions at Earl's Court were similarly treated, and again coupled with a short doubling of the line, and benefit again accrued in the increase of the trains from 40 to 43, at which figure it now stands.

When all the schemes for improvements in contemplation are executed it is expected to approach to a capacity of 50 trains in the hour in each direction as a maximum.

Only on one other railway in London is there a service at so high a level, and that is on the Hampstead line of the London Electric Railway, where the frequency is 44 trains in the hour at the busiest times. At practically every point on the urban railway system it is possible to afford traffic facilities adequate to the volume of traffic requiring to be carried. This does not mean that there is no overcrowding, for overcrowding, in the sense of people standing in the cars, must be regarded as a permanent feature of the rush periods of urban traffic operation. But the overcrowding, under all normal or expected circumstances, is not such as to result in discomfort or undue congestion.

The Problem of Peak Loads.—The reason why the problem of peak loads is not acute in London, as in so many cities, is twofold. In the first place, the development of London has taken place with considerable uniformity in all directions, and, while there is a greater development and a greater traffic on the east and west axis, it is not totally disproportionate to the development and traffic of the north and south axis. The passengers that come into the central area come in from all sides, and are distributed over many lines of approach, so that the volume to be handled on one line of approach does not present the difficulty which a restriction in possible lines of movement would create. In the second place, there is some public advantage in the duplication of the means of transit, which is so common a feature of London, so that on a given line of approach there are always two possible alternatives of railway, tramway or motor-omnibus, and in many cases all three.

In this connection the adaptability of the motor-omnibus to a wide distribution of a stream of traffic is not to be overlooked. For example, the stream of vehicles passing through the principal street between Oxford Circus and Bond Street consists of 14 different routes, which fan out on either side, and afford connections to quite a number of suburbs direct, in a way in which a tramway or a railway involving expensive initial construction could not afford to do. On the tramways the peak load problem has been met by the addition of trailer cars. The use of trailer cars is open to argument in London on the grounds both of safety and efficiency, and the practice cannot be considered as finally settled.

Looking ahead, there is no reason to anticipate that density of traffic will ever become a critical factor in determining a policy for the development of traffic facilities in London. The determining factor is not likely to become the mere movement of quantities of passengers to the sacrifice of other factors.

VIII. THE TRAFFIC CLASSIFIED AND DISTRIBUTED ACCORDING TO THE RATE OF CHARGE.

The acute problem of London is the problem of the fare. Some attempt has been made to describe the piecemeal and disconnected way in which the traffic facilities of to-day have been brought into existence, and adventures in fares have gone with almost each. There is a historical background to London traffic, and, interesting as history is, it enshrines in the present relics of the past which stand tenaciously in the way of a harmonious and coherent system. There is no "fares system" in London. The traffic may be analysed into three principal classes and over many rates of fare, but there is no clear definition about any of the figures in relation to the fares charged.

On the Motor-Omnibuses.—The motor-omnibuses have only one price for a journey, that of the ordinary single fare, varying according to the length of the journey. A few transfer tickets, limited to a definite exchange point, where a short connecting service is run specially to link together two important groups of routes, serve in their scantiness to enforce the general principle of a payment on each motor-omnibus for the ride taken. A few cheap return tickets, copied from the tramways, are again too insignificant to count. Over 99 per cent. of the traffic is carried on a straight ordinary fare.

The distribution of this traffic over the different rates of fare shows that 12 per cent. paid a halfpenny and 57 per cent. a penny, so that 69 per cent., or over two-thirds of the total, is short-distance traffic.

Above this price 9 per cent. paid three-halfpence; 13 per cent., twopence; 3 per cent., twopence-halfpenny; 3 per cent., threepence; and 3 per cent., more than threepence. The average receipt from the whole of the traffic is 1·33d.

On the Tramways.—On the tramways there are two distinct classes of passengers. There is the workmen's traffic, travelling on cheap return tickets at fares equivalent to about half the ordinary fare, in pursuance of a statutory privilege to which reference has already been made; and there is the ordinary traffic corresponding to that of the motor-omnibuses. The workmen's traffic is almost 10 per cent. of the whole on the London County Council system. Latterly an extensive experiment has been carried out in the way of cheaper return tickets for ordinary passengers, but so far no results have been published to show whether this has been successful. At the same time, transfer tickets have been introduced, but again with no publication of results as to use or abuse. These experiments arise out of an attempt to counteract the effect of the motor-omnibus competition on the tramways traffic.

The distribution of the traffic on the London County Council tramways, workmen and ordinary together, shows that 32 per cent. paid a halfpenny and 46 per cent. a penny; or that 78 per cent. is, in this case, in the category of short distance traffic, a somewhat larger proportion than that of the motor-omnibus traffic above, due to the inclusion of longer distance traffic travelling under the cheap rates for workmen. Above this price, 7 per cent. paid three-halfpence; 8 per cent., twopence; 1 per cent., twopence-halfpenny; 4 per cent., threepence; and 2 per cent., over threepence. The average receipt from the whole of the traffic was 1·01d., and for the ordinary traffic, exclusive of workmen, 1·12d.

On the Railways.—On the railways there are three distinct classes of passengers. There is a statutory workmen's traffic, as on the tramways. There is a large commuted traffic travelling on season tickets, calculated at 10 or 11 fares for a week's riding, and issued for one or three months as a usual period. There is no limitation in the number of rides which may be taken on a season ticket, and, from observations made on urban railways, the number approaches an average of three per day, so that the discount on this class of passenger is quite appreciable. Lastly, there is the ordinary traffic again.

Taking the London Electric and Metropolitan District Railways as typical of the urban system, then 16 per cent. of the total traffic falls into the workmen's class and 8 per cent. falls into the commuted class, leaving 76 per cent. of ordinary passengers. On some railways there is a further class distinction into first and third, but this is of little significance, and may be ignored. The first-class traffic is some 4 per cent. of the total ordinary traffic.

It is possible to give figures for the London Electric Railway, distributing the ordinary traffic over the different rates of fare. There are no halfpenny fares on the railways; the penny traffic is 25 per cent. of the whole, contrasting strongly with the proportion on the surface systems. Above this, 9 per cent. paid three-halfpence; 32 per cent., twopence; 5 per cent., twopence-halfpenny; 23 per cent., threepence; and 6 per cent. over threepence. The average receipt from the whole traffic of this railway is 1·68d., and for the rest of the traffic, excluding the workmen, 1·86d. The inference to be drawn from the figures is that the railway, as would be expected from its superior speed, meets the requirements of the long-distance passenger.

IX. THE FARES CHARGED.

The key to the fares situation of London is the rate of charge for ordinary passengers, as the fares charged to workmen and other favoured classes are based finally in relation to the fare for the ordinary passenger.

Factors Affecting the Amount of the Ordinary Fares.—There is no one person who can fix the ordinary fares of London as he likes, so many people are interested in them, and so many factors, almost as many as there are people, come in to govern the possible development of a uniform situation. Some of these factors may be indicated here, In the first place, railways and tramways have certain fares fixed for them by statutory enactment. In the second place, there are the anomalies surviving from the past, and confirmed, in a conservative mind, by daily use and wont so as to be almost past disturbance. There are numbers of agreements made in early days affecting small points in fares in an incidental manner which have a wider effectiveness in these later days than was originally contemplated. In the third place, there is the continued conflict of interests in London traffic which led in the past, and may again lead in the future, to fare cutting, not, may be, universally, but only partially and locally. Latterly the policy of the London County Council, as the tramway authority, has been towards reductions of fare over all its system, and this policy raises a curious question having regard to the financial condition of its tramways. These tramways are not necessarily worked under ordinary commercial conditions, as there is behind them a financial guarantee out of which to meet the losses by an addition to the public rates. The payment of rates falls on fewer shoulders than the payment of fares, and there must be a constant temptation towards a cheapening of the cost of travel. This temptation is the more insidious because it is a patent fact that, up to a point, the cheaper the fare the greater the volume of traffic and the better the general result. This has been the experience obtained in the whole series of fare reductions, but only up to a point. There is a saturation point for traffic, and to over-pass this point with further reductions is only to suffer loss; but against the risk of this there is in existence no guarantee. Lastly, there are the efforts of different experts to so adjust the fares as to charge what the traffic will bear under the particular theories which they may chance to hold.

Coinage in Relation to Fares.—One factor affecting the amount of a fare is deserving of more detailed consideration, because it has a positive determining effect, and that is the coinage of the country. It is necessary to take note of what are the common coins of the country, and the relation existing between the several denominations of coins. In London, the common coins are the penny and

Digitized by Google

halfpenny and the farthing. The numbers of these coins in circulation at the close of the year 1911 was :—

Pence	836,950,560
Halfpence	507,821,280
Farthings	211,060,800

The figures are given to show that the halfpence and farthings must still be counted as effective coins. The farthing has no relation to-day to charges for passenger traffic, and so it may be ignored, but the halfpenny has, and calls for attention. There are not two pennies in circulation to each halfpenny. The halfpenny press has an enormously greater circulation and popularity than the penny press. The halfpenny cannot be ignored. These are bronze coins. The lowest denomination of silver coin is the threepenny bit, and the next highest, the sixpence. Of threepenny bits, there were issued in the last ten years, 54,000,000, and of sixpences, 80,000,000. The threepenny bit is not to be regarded as a convenient coin, owing to its small size. It has a lucky significance, and certainly tends to be easily lost. On the other hand, the sixpence is a coin too highly valued to be of much use in connection with a scheme of charges for urban traffic, so that the pertinent factor has to do solely with pennies and halfpennies.

Costs of Operation per Passenger.—While it cannot be regarded as a factor determining the amount of the fares, yet the amount of the fares must have some relation to the cost of operation per passenger. For the year 1913, the results of operation of several of the companies working in London may be set out in tabular form to illustrate this point :—

	Gross Earnings per Passenger.	Expenses per Passenger.	Net Earnings per Passenger.
	d.	d.	d.
London Electric Railway	1·08	·83	·85
Central London Railway	1·60	·94	·66
City and South London Railway ...	1·54	·97	·57
District Railway	1·83	·88	·95
London General Omnibus Company, Limited	1·33	·94	·39
London County Council Tramways ...	1·01	·73	·28

While not any one of these figures can be looked upon as a stable indication of the level of cost, the sequence of them may be taken to tentatively point to the fact that for the railways, at any rate, the cost of operation swallows so much of the penny as to make an average receipt of this sum inadequate for the payment of a reasonable rate of interest on the capital invested in them, and that while, for the tramways and motor-omnibuses, an average receipt of approximately a penny enables them to fairly discharge all their obligations, it leaves no margin of security against mischance or ill-luck, nor any margin for the future development of the system, which is a matter of urgent importance. On the whole, it is necessary that the average receipt from passenger traffic in London should exceed a penny, and that on the railways, with the growth of the metropolis and the increase in longer distance travel, it should approach more closely to twopence than it now does. The level of average fare for the two opposed systems, the underground and the surface, is disparate, and this adds another complexity to any consideration of the fares problem.

The Existing Scale of Fares.—Sufficient data have been given to show that, once and for all, London is prevented from adopting a flat fares scheme similar to that which obtains in most cities of America. The flat fare, to please, would have to be a penny, for almost 70 per cent. of all the existing traffic is carried at or below this price, and the penny is not practicable traffic politics.

A flat fares scheme has been tried in London on the Central London Railway. From the date of its opening until 1906, it persevered with a uniform charge of twopence. In this year, it carried 36,722,497 passengers, of which 11·65 per cent., or 4,278,171, were carried over short distances up to three stations, and 24·21 per cent., or 8,890,516, were carried over long distances exceeding nine stations. From 1906 onwards, this railway has felt particularly the competition of other railways and of motor-omnibuses, and has had a constantly declining traffic. In 1908 it had given up its original single fare of twopence in favour of two fares, twopence and threepence, and in 1913 had gone further still with the introduction of a penny fare. In this year, the penny passengers numbered 15,459,827, which, compared with the 4,278,171 of 1906, shows over three-fold growth. The threepenny passengers numbered 2,907,795, which, compared with the 8,890,516 of 1906, shows an exactly inverse decline. Here again the large influx of penny passengers shows the public demand for a ride at the price, so that, failing a penny flat fare, a differential scheme of fares is inevitable, and this is the scheme which London has.

The differential scheme of fares adopted in London has relation to distance as its criterion. There are critics of this, in that distance has a varying value in different quarters of the metropolis. For instance, on the short north and south axis the fares tend to be higher than on the long east and west axis, because there is a feeling that the two should correspond in price. Again, in the prosperous west-end, as opposed to the working class east-end, the rate of fare per mile tends to be higher, though this is more a converse illustration of a variation in the value of money. Other criteria might be suggested as a basis for a differential scheme, such as the value of the service rendered, the time at which the journey is to be performed, a geographical arrangement of zones ; but all these are foreign to the existing practice of fare making, and at enmity with existing fares.

In order to illustrate the scale of fares which is now in force, the London Electric Railway may be taken as representative of the railway system, and the London General Omnibus Company as representative of the surface system. Taking the fares of these companies and averaging the distances offered for each separate fare at each denomination, it is possible to make a comparison of the relative distances carried by each of them for a given price. This is shown in the following table :—

Rate of Fare.	L.E.R.	L.G.O. Company, Limited.	Difference.
	Miles.	Miles.	Miles.
1d.	1·4	1·7	·3
1½d.	1·9	2·4	·5
2d.	3·2	3·4	·2
2½d.	3·9	4·3	·4
3d.	5·1	5·2	·1

The result is that not only is there a differential scheme of fares in London, but two such different schemes—the one for the railways and the other for the surface systems. The discrepancy between the two schemes is less marked in average figures than in actual direct comparisons, for an average always tends to hide the extremes, but for the purpose of this comparison it is a fairer figure.

The discrepancy between the two schemes is greatest at the lowest fares and tends to become less as the fare increases, until at over threepence the railway is as cheap and often cheaper than any other means. This arises from the railway practice of adopting an accumulative or sliding scale of charges, in contrast to the older practice of the motor-omnibus and tramway of arriving at the higher fares by a simple addition of the lower ones. In imitation of the railways, the surface systems have copied the sliding or accumulative scale in part, and are tending to copy it extensively. As their base distance at one penny is greater than on the railways, the extension of their higher fares tends to a very great degree of cheapness, so that fares get to be at rates much under even a halfpenny a mile.

X. THE FARES PROBLEM.

The Equalisation of Fares.—It will be recognised how exceedingly intricate and complex is the fares problem that waits solution in London, and how full of pitfalls are the paths open to the reformer. This very complex situation is an explanation of one great source of struggle for London traffic. There is no rest and no finality in any dealing with fares, and month by month changes take place in the way of closing up the gaps on one side and, again, of widening the gaps on the other side. There is no standard or definition of what is a reasonable or proper fare to which the many people taking part in the game can refer. The statutory level is a penny a mile, but this is in excess of what is a practicable level. It may be generally stated that the railway fares are, if anything, on the high side, and for several years now, as opportunity offered, a succession of steps have been taken by way of bringing them down to a better level. These steps have not enabled them to overtake the level of the surface fares, and there are still many steps to take, but the whole tendency is towards an equalisation of fares, at any rate, at the lower prices. There seems little reason why, up to threepence, the rate of charge for all systems of transit should not be approximately alike. Over threepence the advantage in rate of fare might reasonably rest with the railways, as they only are in the position to meet the requirements of the long distance traffic. Meanwhile the multitude of discrepancies continues, and some fares have fallen below a remunerative level. Sir Thomas Gresham, in the Elizabethian time, made the discovery that spurious money always tended to oust good money from circulation, and a similar effect may be traced among fares. A low fare, or rather a bad low fare, always tends to eat into all the other fares in its neighbourhood, and for this there is no cure. This is the great pity of the mistakes. The downward path is the easy path, but to put a fare up calls for much courage and obstinacy. It is a very rare occurrence that a fare is put up.

Excessive Differentiation.—The differentiation in fare is also carried too far. The jump in price from one penny to twopence is 100 per cent., and the three-halfpenny stage is useful in breaking this down. The jump in fare from twopence to threepence is 50 per cent., and the twopence-halfpenny stage may also be useful as a bridge here. People have a tendency to save their halfpence, even by getting out at a point short of their real destination to save passing into another fare stage, and at a penny rise this tendency is accentuated. The jump from threepence to fourpence is only 33⅓ per cent., and at this point the full penny rise is only proportionately equivalent to the previous halfpenny rise, and the halfpenny stage does not seem to be warranted. A fares scale is thus possible with the following denominations:—One penny, three-halfpence, twopence, twopence-halfpenny,

Digitized by Google

threepence, fourpence, fivepence, sixpence. Beyond sixpence there is scarcely need to go, for all regular traffic. In fact, fourpence seems to be the limit fare. Regular traffic from beyond the fourpence limit is almost wholly commuted traffic, and the commutation works out to an extended fourpence limit and no further.

The application of these denominations is further complicated by the problem of the choice of the accumulative or the simple additional scale to which reference has already been made. The accumulative scale has a real value in affording ever widening zones round the point from which the reckoning is taken, for every increase in price. It affords much greater scope for development without insisting upon a low initial basis. It must be regarded as a fixed element in any London scheme. It has the defect of obscuring the basis of charge, so that there is no sure and easy way of advertising to the public what the fare is between any two stage points or stations. It is easy to add fares together, but difficult to adjust them in accordance with some progressive scheme of discounts.

The Characteristics of a Fares System.—This point brings up the question of what are the characteristics of a good system of fares. That they should be even in their incidence, sure and settled in their composition, known in their existence, and simple in their arrangement, seem the four cardinal qualities. None of these qualities are present in the London scheme as it is to-day, and there is the great drawback and the great puzzle—a new fares system for London, which will give the public what they want, which is as much for their money as they can get; and give the traffic companies what they want, which is as much business as they can carry; and give the shareholders what they want, which is a fair and steady dividend.

XI. THE FINANCIAL RESULTS OF 1913 AND THE PROSPECTS FOR THE FUTURE.

The Heavy Capitalisation and the Low Return.—A vast deal of money has been sunk in the provision of the traffic facilities of London, amounting to over £90,000,000, without bringing into account the expenditure of the main line railways within the area, for this cannot be ascertained. Of this amount £66,000,000 is in the position of ordinary capital sharing the net sums earned, whether they be great or small, and the unfortunate fact remains that they are small—too small to place this great enterprise on a prosperous or satisfactory footing. The total amount available for dividends on the ordinary capital was in 1913 £1,390,000, or only sufficient to pay a dividend of just over 2 per cent. all round.

Of the amount spent, £63,000,000 represents the urban railways. The largeness of this figure is due to the high cost of construction per mile of the original deep-level tube railways. The London Electric Railway has cost £785,000 per mile of railway open for traffic.

Certain sections of the District and Metropolitan Railways, in the central area, have cost as much as £1,000,000 per mile. This is a terrible sum to pay a dividend on out of penny fares.

The only real remedy for this is expansion of traffic.

Expansion of Traffic.—Large as the traffic in London is, it is not so great as that of other great cities of the world, proportionately to its size. Greater New York, for example, has a population which travels 338 times in the year per head, and there are several other big American cities approaching the 300 line. In Europe, Greater Berlin has a population that travels 293 times. It may confidently be expected that London will increase its journeys per head from 271 up to 300 in the next few years, and it is a piece of arithmetic what this means to the existing companies. To pay 4 per cent. on the capital now invested, that is to realise a net earning of £1,390,000 more after allowing for increase in expenses, requires an extra 36 journeys per head of population at the present average receipt per passenger.

But the population is not stationary, and so, with increased facilities, a hopeful conclusion may be looked for. There are two limits set to the traffic expansion, the limit of fare and the limit of time occupied on the journey. London is not yet developed to the area of fare limit or of time limit, so that there is ample room for growth. The fare limit has been indicated at fourpence. The time limit may be set at 40 minutes. The time zone is capable of greater extension by the adoption of various operating expedients, such as faster train equipments, non-stopping and through express connections.

Advertising for Traffic.—People need to know what the traffic facilities are if they are to use them freely. Ordinary people will only take the trouble to learn on their own account the way to and from business or the places of their regular resort. If they are to learn much else, they have to be told over and over again in different ways until it is stored in their memories. This is the aim and purpose of advertisement.

It has been the policy of the Underground Electric Railway Company of London, Limited, to make a liberal use of the arts of advertisement in connection with its many traffic undertakings. To this end, millions of maps of the Underground system have been printed and distributed, and maps of a more permanent character in glass or enamelled iron have been fixed where they can always be seen. Direction signs and notices with a specific device have been placed at important street corners, at sports grounds, at amusement centres, at main line stations, and everywhere where people congregate, in so far as permission was obtainable on reasonable terms.

Picture posters and leaflets are issued month by month of current interest, and containing such novel elements as have come to hand. Notices are placed in the newspapers and, generally, an extensive campaign in the way of dissemination of news and information is always being carried on. To this campaign is to be attributed part of the growth in London traffic, and from it more growth is to be anticipated in the future. It has also served to establish in the public mind a feeling of goodwill, which is not one of the least assets. It is common opinion in London that the advertising of this group of companies is of remarkable and noteworthy interest. It may therefore be said to have fulfilled its aim and purpose.

Conclusion.—But unless to the detailed solution of the commercial and operating problems of the movement of traffic there can be brought a spirit of co-ordination and co-operation, the solution can never be complete or conclusive. Only in this way can the development of the traffic facilities be carried out with economy, and the traffic conserved to afford opportunities for dividend on the money already sunk in their provision.

THE WAR AND TRAMWAY TRAFFIC.

MOTORMEN OF MILITARY AGE.—TRAMWAYS AND THE MUNITIONS ACT.

A joint deputation from the Tramways and Light Railways Association, the Municipal Tramways Association, and the British Electrical Federation recently waited upon the Reserve Occupations Committee for the purpose of urging the importance of retaining a sufficient number of motormen and other skilled men in order to carry on the various tramway services, which, in many cases, involves the conveyance of men to munitions and other Government workshops. Returns were submitted showing that there are 11,638 drivers employed on municipal tramways, of whom 7,000 are of military age. Company undertakings employed 3,356 motormen, of whom 1,983 are of military age. The number now employed is considerably below the total employed in normal times. A number of the men given as being of military age have been rejected by the military authorities on various grounds.

Chesterfield Council have made an application to the Ministry of Munitions for the tramways undertaking to be constituted a controlled establishment. It is doubtful whether the whole undertaking can be so dealt with. Under the amendment of the Munitions Act, adopted by the House of Commons an January 4, the definition of munitions work is extended to light, power, and tramways facilities, "only in cases where the Minister of Munitions certifies that such supply is of importance for the purpose of carrying on munitions work, and the erection of buildings, machinery, and plant required for such supply."

Sir Wm. Clegg, chairman of Sheffield Tramways Committee, informed the Corporation on January 12 that tramway employment now being regarded as a "reserved occupation," they had persuaded the Board of Trade to exempt the skilled men in their service from being called to the colours. They were endeavouring to get the same treatment for the drivers. So far they had not succeeded, but it seemed to him a necessary corollary to what they had already obtained, for, without the drivers, the work of the skilled men would be useless.

West Hartlepool tramways manager has applied for postponement to a later group in the cases of motormen who were affected by the first proclamation calling up the Army Reserve.

Burnley Council have authorised the tramways manager to ask the recruiting tribunal for the retention of the motormen attested for the Army Reserve.

Thornley Council have decided to support the Tramways Company in obtaining exemption or postponement from army service of their employees. If any drivers are taken away the service between Wheatley, Thornley, Coxhoe, and Durham is threatened with suspension.

The training of volunteer motormen at Birmingham has advanced sufficiently to allow of their services being utilised on the cars during the week-ends. Fifty professional and business men are thus engaged.

In accordance with the Home Office Order for taking precautions against airship raids, the reduced lighting regulations for vehicles became applicable to a largely extended area on January 10.

In consequence of the new lighting order, the speed of the cars has been reduced at Birmingham from a maximum of 16 to 10 miles per hour. The average speed has been lowered from 7½ to 6½ miles.

Metropolitan Association of Electric Tramways Managers.—A meeting of the members was held on January 14, at the Municipal and County Club, Whitehall Court, Whitehall, S.W., when the following were present:—Messrs. Ullmann (East Ham), chairman; Schofield (Leyton), vice-chairman; Moffet (West Ham); Harvey (Ilford); Mackinnon (London United); and Goodyer (Croydon), hon. secretary. Letters of inability to attend were received from Messrs. Fell (L.C.C.), Bruce (L.C.C.), Murray (Walthamstow), Stokes (Bexley), Hammond (Metropolitan Electric), Williams (Erith), and Mason (South Metropolitan). Various matters of interest were discussed.

Digitized by Google

FINANCIAL REPORTS AND MEETINGS.

Electrical Utilities Corporation.—A quarterly dividend of 1¼ per cent. on the preferred stock is announced.

Brazilian Traction Company.—The Brazilian Traction, Light and Power Company have declared a dividend of 1 per cent. on the ordinary stock.

Rio de Janeiro Tramways.—The directors of the Rio de Janeiro Tramway, Light and Power Company have declared a dividend of 1¼ per cent. on the capital stock.

London County Council Tramway Receipts.—At the London County Council, on January 25, the Highways Committee reported that the tramway receipts from April 1, 1915, to January 12, 1916, were £1,817,620, as against £1,821,244 for the corresponding period of the previous year, a decrease of £3,624. For the five weeks ended January 12, the number of passengers was 54,291,778, an increase of 1,431,465 over the corresponding period of 1914-15, while the receipts were £228,425, an increase of £6,251.

A Grant from Sheffield Tramways Increased Profits.—Under the special powers given in the Sheffield Corporation Tramways Act, the Tramways Committee recommended that a grant of £5,000 should be made to Sheffield University in view of its valuable war service. When the proposal came before the City Council on January 12, it was opposed by Councillor Neal, who said that last year there was brought in to the credit of the rates from the tramways £34,497. This year the committee had given the Finance Committee notice that they must expect a reduction of about £11,000 on that sum, subject to further problematical increases in wages and to the sum which they would be charged for excess profits. Sir William Clegg in reply said the main point was whether they could make the grant out of their increased profits. After taking into account all the increased expenditure, including increases in wages, the net increased profit for the half-year ended September 29 last was £11,885, and by the end of the financial year ending March 25 they would have an increased net profit over the previous year of nearly £20,000. The recommendation was agreed to.

Edinburgh and District Tramways Company.—The statement of accounts for the year ended Dec. 31, 1915, shows total receipts £311,877, and expenditure £283,757, as against £312,990 and £276,672 respectively in 1914. The expenditure included £114,174, for Corporation charges, for rent, etc. On the profit balance of £28,120 there was a decrease of £8,198, as compared with the year 1914. Receipts per mile run were equal to 11·63d., and the expenditure to 10·58d., while the profit equalled 1·05d. per mile run. The percentage of expenditure to receipts was 90·98. The number of miles run was 6,437,644, a decrease of 226,337, and the passengers numbered 66,516,137, being a decrease of 1,086,779. Out of the sum of £3,193 at the credit of the preferred shareholders, the directors recommend the payment of a dividend at the rate of 5½ per cent. per annum, and an additional dividend of 1½ per cent. for the year. A dividend of 2s. per share is recommended out of the sum of £2,892 at the credit of the deferred shareholders, leaving £1,142 to be carried forward to their credit. Nearly 500 of the employees are serving with the colours, and £5,432 was paid to dependents.

Effect of East London Railway Electrification.—The report of the East London Railway Company for the year ended December 31, 1915, shows a marked increase in passenger traffic since the lines were electrified in June, 1913. The number of passengers in 1913 was 5,149,064, in 1914, 6,172,121, and in 1915, 8,497,284. Owing to the railway now being under Government control, the receipts and working expenses cannot be given. At the previously ascertained average rate of 1·27d. per each passenger, the passenger traffic should now yield about £45,000 per annum. Owing to largely increased bookings to and from the two New Cross stations, which afford relatively full mileage, the rate is, however, probably higher. The passenger lifts at Wapping were brought into use on October 4, thus rendering unnecessary the ascent or descent of 100 steps, and largely increasing the bookings. The lines operating by electric traction include 3 miles 58 chains of double line and 25 chains of single line. Presiding at the annual meeting, Lord Claud Hamilton referred to the great increase of traffic. While in 1912 they carried 4,224,059 passengers, the number last year was 8,497,284. It might be said that the war had had something to do with the increase owing to munition workers and other people using the line, but he believed it to be rather due to the facilities given, especially for through booking on the Metropolitan and District Railway.

Yorkshire (West Riding) Electric Tramways Company, Limited.—The eleventh ordinary general meeting was held on January 21 at the offices of Messrs. Leon Brothers, 31, Throgmorton Street, E.C. Sir Herbert S. Leon, Bart. (chairman), presided, supported by the directors, Mr. George E. Leon, Mr. B. Newgass, and Mr. E. Remnant. The Chairman moved the adoption of the report and accounts. He pointed to the growing character of the company's business, the passengers carried during the year being 11,602,483, and mileage 1,763,702, as against 10,716,858 and 1,778,509 respectively. The revenue amounted to £81,086 10s. 9d., against £74,110 2s. 6d. for 1914, but the working expenses had increased by £3,474. The figures in the report showed the progressive way of the business, the increase being satisfactory and, so far as they could tell, being in no way due to the war conditions. The company was now reaping the fruits of the foresighted policy adopted in years gone by. They had always looked ahead and done their best to encourage traffic. He referred to the difficulties encountered in carrying on the services owing to the loss of so many experienced men, a matter which showed itself in the compensation account, and expressed regret that at the outbreak of the war the Government had not devised some scheme for protecting and maintaining the public utility services so necessary for war workers. The labour difficulty had now become acute, and the staff changes in a month numbered 267, against a normal 30 among some 300 employees. Mr. G. E. Leon seconded, and a discussion followed, in which Dr. Woody, Messrs. Taylor, Davenport, C. Lock, Green, and others took part. Considerable praise was accorded the Board on the successful working of the undertaking and the devotion of Mr. Harry England (general manager and secretary) and his staff, the only criticism being the suggestion as to dealing with past arrears and interest on preference shares. The chairman promised the matter should have the continued consideration of the Board, whose policy was to do nothing at the present moment to impair the admitted financial soundness of the undertaking. Sir H. S. Leon, Bart., and Mr. B. Newgass were re-elected to the directorate. The report recommended a dividend of 6 per cent. on the preference shares, carrying forward £15,054. The sum of £12,962 had been set aside for depreciation.

DUBLIN UNITED TRAMWAYS COMPANY.

The report for the year ended December 31, 1915, shows that £64,939 is available for distribution. The directors recommend the payment of a dividend of 6 per cent. per annum less income tax on the preference shares, and a final dividend at the rate of 5 per cent. less income tax on the ordinary shares for the half-year ended December 31, a sum of £18,000 to be set aside towards renewal of rails, and £5,000 to the reserve and renewal funds. The appended summary of the accounts for the past three years shows that the business has been well maintained since the outbreak of war :—

	1913.	1914.	1915.
RECEIPTS—			
Traffic receipts	£284,816	£306,083	£317,762
Parcels delivery	5,769	7,129	7,467
Advertisements	4,132	4,969	4,143
Carriage of goods	1,025	1,551	1,874
Other receipts	1,989	2,164	2,653
Total receipts	297,731	321,896	333,899
EXPENDITURE—			
Working and general expenses...	172,604	184,625	201,836
National insurance	881	945	961
Repairs to cottages	700	868	1,235
Parcel delivery expenses ...	3,102	3,934	4,400
Goods carriage expenses ...	572	868	951
Total expenses	177,859	191,240	209,383
Balance on working	119,872	130,656	124,516
Balance from last account ...	11,258	9,958	11,366
Interest	1,982	2,076	1,902
Total balance	133,112	142,690	137,784
DEDUCTIONS—			
Interest on debentures, etc. ...	26,373	26,856	25,421
Wayleaves	15,241	14,427	13,518
Payment to Howth Company ...	3,000	3,000	3,000
Renewals at sub-station ...	458	360	—
	45,072	44,643	41,939
Balance available for division ...	88,040	98,047	95,845
Dividend on preference shares 6 per cent. for year	33,900	33,225	31,200
Interim dividend on ordinary shares for half year	18,645 (6 p.c.)	15,469 (5 p.c.)	14,781 (5 p.c.)
Final dividend on ordinary shares, 5 per cent. for half year ...	15,537	14,987	13,819
Reserve for renewals of permanent way	7,000	18,000	18,000
Reserve and renewals fund ...	3,000	5,000	5,000
Balance to next account	9,958	11,366	13,045
	88,040	98,047	95,845

Digitized by Google

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track). Mls.	Chs.	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Other.	Total.
Aberdeen ...	*May 31, 1915	Dec., 1899	E.	27	56	415,000	366,332	48,668	366,332	13,225	184,118	234,194	189,803	86,614	1,388	88,002
Accrington ...	Mar. 31, 1914	Aug., 1907	,,	10	53	181,925	133,875	48,050	134,734	12,636	113,870	20,864	16,581	29,843	350	30,193
Ashton-u-Lyne..	Mar. 25, 1914	Aug., 1902	...	8	15	130,070	109,814	20,256	109,814	13,412	73,958	32,270	2,950	23,341	677	24,019
Ayr	*May 15, 1915	Sept., 1901	,,	9	30	128,000	98,630	29,369	100,705	10,742	78,770	27,866	17,649	17,181	804	17,985
Birmingham ...	*Mar. 31, 1915	Jan., 1904	,,	118	71	2,858,935	2,437,104	421,831	2,472,938	20,801	1,940,158	496,946	176,726	640,091	6,923	647,014
Blackburn ..	*Mar. 25, 1915	Mar., 1899	,,	24	63	408,174	342,474	65,700	336,258	13,566	354,600	191,985	3,718	65,158	3,144	68,302
Blackpool ..	*Mar. 31, 1915	June, 1899	,,	(p)21	51	460,473	316,005	144,468	316,005	14,604	316,005	138,577	19,698	75,344	761	76,105
Bolton	*Mar. 31, 1915	Dec., 1899	,,	47	69	551,092	551,092	Nil	570,981	11,930	348,111	202,980	43,059	140,182	1,228	141,410
Bradford ..	*Mar. 31, 1915	July, 1898	,,	(h)118	9	1,280,788	1,043,788	237,000	1,043,054	8,831	634,618	439,321	75,208	309,320	20,568	329,888
Brighton	*Mar. 31, 1915	Nov., 1901	,,	17	15	378,093	279,978	98,115	280,392	16,314	211,268	69,124	7,562	54,413	2,113	56,526
Burnley	*Mar. 31, 1915	Dec., 1901	,,	22	18	388,052	326,077	61,975	232,580	10,465	170,852	72,664	29,550	77,161	1,306	78,467
Burton-on-Trent	*Mar. 31, 1915	Aug., 1903	,,	10	50	108,632	104,562	4,070	106,275	10,121	47,788	56,784	10,134	15,223	1,510	16,733
Bury	*Mar. 31, 1915	June, 1903	,,	(b)36	10	407,800	284,745	123,055	293,237	12,826	254,832	55,416	33,960	68,740	276	69,016
Chester	*Mar. 25, 1915	April, 1903	,,	6	35	92,991	82,380	10,611	82,934	12,883	66,977	16,059	5,072	12,935	317	13,252
Chesterfield ...	Mar. 31, 1914	Dec., 1904	,,	5	8	98,000	73,500	24,500	69,810	13,663	57,660	13,820	6,307	13,608	465	14,073
Colchester ...	*Mar. 31, 1915	July, 1904	,,	7	75	70,748	69,555	1,193	69,471	8,736	48,360	22,007	Nil.	13,413	380	13,793
Croydon	*Mar. 31, 1915	(q) Sept., 1901	,,	17	50	287,689	287,689	Nil	286,765	16,271	222,223	107,039	41,643	87,833	781	88,614
Darlington ...	*Mar. 31, 1915	June, 1904	,,	8	71	107,500	77,889	29,611	8,748	77,870	55,236	25,881	7,369	13,451	261	13,712
Darwen	*Mar. 31, 1915	Oct., 1900	,,	7	13	93,400	86,300	7,100	87,199	12,174	51,200	33,555	9,396	14,645	988	15,633
Derby	Mar. 31, 1914	July, 1904	,,	22	20	239,980	239,980	Nil	245,332	11,026	177,676	67,656	(l)32,356	E51,126	1,048	52,174
Doncaster ...	Mar. 31, 1914	June, 1902	,,	12	58	...	...	...	107,921	8,481	94,700	16,581	1,442	22,890	318	23,208
Dundee	*May 15, 1915	July, 1900	,,	28	32	(f)	362,789	...	371,145	13,068	266,027	96,762	92,694	66,320	1,954	68,274
East Ham ...	*Mar. 31, 1915	June, 1901	,,	14	16	192,270	191,016	254	196,309	13,824	129,336	78,806	...	59,552	680	60,232
Exeter	*Mar. 31, 1915	April, 1905	,,	7	0	106,000	88,818	17,182	88,818	12,688	67,966	21,360	6,420	17,964	55	18,019
Gloucester ...	*Mar. 31, 1915	April, 1904	,,	15	1	191,000	144,333	46,667	147,783	9,846	104,965	22,901	1,000	16,693	1,114	17,807
Halifax	*Mar. 31, 1915	June, 1898	,,	55	39	449,263	417,466	31,797	420,185	7,570	283,249	129,670	36,442	111,792	1,378	113,170
Ilford	*Mar. 31, 1915	Mar., 1903	,,	12	49	152,883	152,883	Nil	149,574	11,859	102,839	50,043	3,239	31,539	442	31,981
Ilkeston	Mar. 31, 1914	May, 1903	,,	3	56	64,214	47,000	17,214	47,833	13,436	31,462	16,422	...	6,915	171	7,086
Ipswich	*Mar. 31, 1915	Nov., 1903	,,	14	70	116,471	114,300	2,171	115,676	7,776	94,894	115,549	15,940	22,796	493	23,289
Keighley	Mar. 31, 1913	Oct., 1904	,,	6	9	50,934	47,328	3,606	47,328	7,743	32,468	16,961	942	8,845	313	9,158
Kilmarnock ...	*May 15, 1915	Dec., 1904	,,	5	47	65,000	52,795	12,205	52,801	9,450	46,450	10,078	6,618	8,416	201	8,617
Kirkcaldy ...	*May 15, 1915	Feb., 1903	,,	8	65	213,000	97,868	115,132	97,868	11,105	76,466	21,402	5,223	16,564	412	16,976
Lancaster ...	*Mar. 31, 1915	Jan., 1903	,,	4	65	...	45,700	...	43,711	9,083	28,750	17,669	3,342	5,534	159	5,693
Leith	*May 15, 1915	Aug., 1905	,,	17	73	275,000	238,000	37,000	237,983	13,286	171,500	66,070	6,604	36,298	1,086	37,384
Leyton	Mar. 31, 1914	Dec., 1906	,,	18	8	324,201	324,145	56	295,376	16,319	240,741	57,244	2,654	69,148	1,541	70,689
Lincoln	*Mar. 31, 1915	Nov., 1905	S.	2	77	98,519	44,947	53,572	44,987	15,185	40,226	12,529	(l) 692	6,435	117	6,552
Liverpool ...	Dec. 31, 1914	Nov., 1898	E.	124	0	2,622,786	2,057,850	564,936	2,062,391	16,741	1,168,685	1,177,949	366,545	684,026	13,050	697,076
Lowestoft ...	Sep. 30, 1914	July, 1903	,,	4	6	96,230	91,178	5,052	91,178	22,375	75,480	17,614	Nil	11,357	373	11,730
Maidstone ...	*Mar. 31, 1915	July, 1904	,,	7	3	82,932	82,932	Nil	79,398	11,282	63,598	19,334	...	10,402	602	11,004
Manchester ...	*Mar. 31, 1915	June, 1901	,,	203	31	2,361,038	2,207,215	153,823	2,216,009	10,895	1,648,183	548,499	438,497	887,763	14,112	901,875
Nelson	*Mar. 31, 1915	Feb., 1903	,,	3	69	38,000	37,885	115	37,885	9,808	28,086	9,799	...	9,300	52	9,352
Newport (Mon.)...	*Mar. 31, 1915	April, 1903	,,	14	28	232,500	196,250	36,250	196,184	13,671	155,216	49,868	3,479	41,752	952	42,704
Nottingham ...	*Mar. 31, 1915	Jan., 1901	,,	44	20	...	...	...	733,674	16,586	473,999	261,364	56,626	176,289	3,026	179,315
Oldham	*Mar. 25, 1915	May, 1902	,,	28	32	506,723	446,347	60,376	453,655	15,981	303,738	166,268	2,222	111,679	2,135	113,814
				(b) 8	31											
Perth	May 15, 1914	Nov., 1913	,,	6	75	90,000	78,350	11,650	78,629	11,334	...	...	...	8,944	928	9,872
Plymouth ...	Mar. 31, 1914	Sept., 1899	,,	15	0	182,856	181,479	1,377	219,417	14,628	86,903	89,493	24,252	39,989	891	40,880
Pontypridd ...	Mar. 31, 1914	Mar., 1905	,,	8	48	...	...	...	133,143	15,482	...	...	...	23,280	320	23,600
Rawtenstall ...	*Mar. 31, 1915	May, 1909	,,	15	71	193,290	182,172	11,118	182,276	11,709	150,324	31,848	3,051	24,460	1,076	25,536
Rochdale	*Mar. 31, 1915	May, 1902	,,	(i) 40	2	356,991	347,782	9,209	353,200	15,407	347,782	108,034	16,000	77,660	5,742	83,402
Rotherham ...	*Mar. 31, 1915	Jan., 1903	,,	12	2	342,200	188,326	153,874	184,178	15,316	150,485	39,473	21,771	43,834	59	43,893
			R.T	...	...	...	...	...	...	...	...	...	...	...	...	...
Salford	*Mar. 31, 1915	Oct., 1901	E.	75	64	1,086,472	723,717	362,755	725,485	9,571	511,853	282,115	30,058	257,935	42	257,977
Southampton ...	*Mar. 31, 1915	Jan., 1900	,,	18	54	280,452	260,699	19,753	259,834	13,913	158,729	99,470	14,251	68,042	2,996	71,038
Southend-on-Sea	Mar. 31, 1913	July, 1901	,,	11	49	130,000	129,961	39	143,808	12,384	116,940	12,784	3,045	34,453	465	34,918
Southport ...	*Mar. 31, 1915	July, 1900	,,	(d) 10	63	292,000	197,730	94,270	196,178	8,424	67,250	57,870	442	19,970	450	20,420
South Shields ...	*Mar. 31, 1915	Mar., 1906	,,	10	21	251,882	184,056	67,826	181,097	17,646	155,214	37,314	30,837	39,275	570	39,845
Staly'ge, H., M., D.	*Mar. 31, 1915	May, 1904	,,	27	57	325,270	280,990	44,280	279,778	10,096	209,387	71,603	1,211	37,490	130	37,620
Stockport ...	Mar. 31, 1914	Aug., 1901	,,	27	5	318,847	234,500	84,347	251,514	9,294	158,391	76,109	37,179	66,715	1,322	68,037
Sunderland ...	*Mar. 31, 1915	Aug., 1900	,,	20	28	308,699	303,211	5,488	306,766	15,074	161,996	132,265	45,044	75,229	386	75,615
Swindon	Mar. 31, 1914	Sept., 1904	,,	4	42	...	...	...	44,216	9,771	33,861	11,738	7,237	8,602	309	8,911
Wallasey ...	*Mar. 31, 1915	Mar., 1902	,,	19	77	208,867	195,290	13,577	222,027	11,122	159,306	72,879	10,612	63,690	815	64,505
Walsall	Dec. 31, 1914	Dec., 1902	,,	19	44	188,145	188,100	45	182,926	9,357	154,044	63,649	34,960	33,311	778	34,089
Walthamstow ...	*Mar. 31, 1915	June, 1905	,,	13	30	198,000	194,000	4,000	190,477	14,251	168,248	25,249	...	41,346	443	41,789
Warrington ...	*Mar. 31, 1915	April, 1902	,,	9	52	103,674	102,896	778	102,128	10,583	67,028	35,869	7,977	22,631	261	22,892
West Ham ...	*Mar. 31, 1915	Feb., 1904	,,	30	4	578,478	551,588	26,890	556,878	18,532	469,051	123,888	26,236	147,703	4,509	152,212
West Hartlepool	*Mar. 31, 1915	Feb., 1904	,,	8	63	85,494	80,330	5,164	81,731	9,301	76,501	3,682	4,614	19,011	494	19,505
Wigan	*Mar. 31, 1915	April, 1901	,,	30	73	502,513	491,007	11,506	481,577	15,579	382,490	157,287	5,034	75,270	2,107	77,377
Wolverhampton	*Mar. 31, 1915	April, 1902	S.	21	40	279,733	268,185	11,548	292,361	13,596	209,497	71,812	53,987	54,593	730	55,323
Yarmouth (Gt.)...	*Mar. 31, 1915	June, 1902	E.	14	58	149,600	124,750	24,850	126,453	8,588	115,700	29,148	9,613	21,872	494	22,366
York	*Mar. 31, 1915	Jan., 1910	,,	12	20	157,150	...	...	163,884	...	151,039	8,596	6,456	29,589	538	30,127

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	*Mar. 31, 1915	Nov., 1905	E.	98	54	1,528,146	1,381,200	136,946	1,455,506	14,702	1,343,000	257,730	96,622	266,249	3,988	270,237
Bexley	Mar. 31, 1914	Oct., 1903	,,	6	42	100,798	98,812	1,986	98,408	15,376	75,408	23,403	942	14,698	1,649	16,346
Birkenhead	*Mar. 31, 1915	Feb., 1901	,,	24	7	378,973	373,290	5,683	373,545	15,548	228,391	143,241	23,062	65,100	685	65,785
Bournemouth ...	*Mar. 31, 1915	July, 1902	,,	(e) 32	67	...	...	...	467,073	18,379	291,667	168,818	17,769	101,882	464	102,346
Cardiff	*Mar. 31, 1915	May, 1902	,,	31	66	832,356	787,292	45,064	811,043	25,484	485,049	302,242	98,778	139,256	36,785	176,041
Coventry ...	*Mar. 31, 1915	Jan., 1912	,,	15	61	251,014	238,355	12,659	238,803	15,151	229,235	14,363	4,095	44,633	771	45,404
Glasgow	*May 31, 1915	Oct., 1898	,,	198	10	4,564,266	3,694,143	870,123	3,751,708	19,127	2,411,868	1,282,275	2,326,543	1,070,694	6,184	1,076,878
				(b) 2	53											
Huddersfield ...	*Mar. 31, 1915	Feb., 1901	,,	56	4	772,662	467,142	305,520	477,919	8,526	281,927	194,599	7,522	124,200	2,859	127,059
Hull	*Mar. 31, 1915	July, 1899	,,	33	12	662,074	594,626	67,448	596,092	17,982	579,628	183,392	147,663	161,750	1,280	163,030
Leeds	*Mar. 31, 1915	Aug., 1897	,,	115	71	1,907,865	1,814,758	93,107	1,678,844	14,487	1,400,687	590,421	4,961	429,902	4,038	433,940
Leicester... ...	Dec. 31, 1914	May, 1904	,,	37	0	1,006,946	818,073	138,290	828,953	22,404	674,936	147,944	91,843	149,664	20,571	170,235
London	*Mar. 31, 1915	...	H.	9	67				...	...	...	...	...	10,261	540	10,801
		May, 1903	C.E	274	35	(c)	(c)	(c)	13,744,806	...	9,836,187	3,786,403	565,095	2,323,130	65,916	2,389,046
N'castle-on-Tyne	*Mar. 31, 1915	Dec., 1901	E.	62	72	1,597,129	1,309,200	287,929	1,332,133	21,178	905,066	524,407	74,656	280,147	13,117	293,264
Northampton ...	*Mar. 31, 1915	July, 1904	,,	12	37	239,800	147,255	92,545	173,019	13,883	118,932	48,610	14,628	30,775	534	31,309
Portsmouth ...	*Mar. 31, 1915	Sep., 1901	,,	34	48	708,619	708,619	Nil	731,174	21,132	423,103	285,516	81,715	121,909	2,082	123,991
Preston	Mar. 31, 1914	June, 1904	,,	17	16	224,102	187,269	36,833	187,269	10,888	117,315	47,130	39,392	45,618	328	45,946
Reading	*Mar. 31, 1915	July, 1903	,,	13	14	235,000	234,000	1,000	237,102	17,996	155,419	75,406	19,471	35,608	1,074	36,682
Sheffield	*Mar. 25, 1915	Sep., 1899	,,	79	8	1,782,471	1,484,400	298,071	1,558,246	19,703	1,122,482	512,567	34,450	391,535	2,996	394,531
Wellington, N.Z.	Mar. 31, 1914	...	,,	31	55	496,423	496,423	...	628,151	19,821	496,423	46,836	120,191	157,096	1,161	158,257

C—Electric conduit system. E—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(b) Includes leased lines. (e) Conferred by Annual Money Act, which limits amounts for each financial year. Powers not exercised are lapsed.
(d) Not including 12 miles 40 chains leased lines. (e) Includes 7 miles 34 chains leased lines. (f) Unlimited. (h) Includes 9 miles 26 chains railless trolley routes.
(i) 17 mi. 8 chn. single track leased. (l) Including Insurance. (p) Including leased lines. (q) Corporation working commenced June, 1906.

Digitized by Google

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit	Deductions from Gross Profit.						Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal	Sundries.	Total.	
Aberdeen	23,291	12,148	7,920	8,166	51,525	36,477	...	4,789	5,179	...	13,840	(i) 1,669	25,477	+ 11,000
Accrington... ...	7,570	2,792	2,268	4,880	17,510	12,683	...	3,969	3,783	198	3,100	65	11,115	+ 1,568
Ashton-und'r-Lyne	5,149	1,682	3,053	3,372	13,256	10,763	...	2,590	3,760	477	800	39	7,666	+ 3,097
Ayr	4,682	(i)2,301	1,494	2,504	10,981	7,004	...	2,487	2,310	...	...	...	7,004	...
Birmingham ...	187,946	(i)86,491	86,067	113,375	473,879	173,135	5,558	71,965	58,402	...	...	730	131,097	+ 47,596
Blackburn	16,859	6,197	14,451	9,421	46,928	21,374	287	(h) 4,388	15,450	251	1,572	...	21,661	...
Blackpool	17,632	(i 7,755	9,239	10,225	44,851	31,254	...	(h) 9,878	7,640	...	...	...	17,518	+ 13,736
Bolton	30,044	(g) 9,486	15,912	20,689	76,131	65,279	857	(h) 10,525	17,520	1,713	18,339	(i) 981	49,078	+ 17,058
Bradford	91,597	(i)36,890	64,670	52,938	246,095	83,793	4,525	22,087	24,164	5,422	7,832	4,203	63,708	+ 24,610
Brighton	14,152	(i) 6,759	13,690	8,384	42,985	13,541	55	7,661	5,917	...	...	...	13,578	+ 18
Burnley	21,142	(i)10,079	9,141	17,955	58,317	20,150	...	6,796	8,284	1,515	...	(f) 1,890	18,486	+ 1,664
Burton-on-Trent...	5,609	(i) 1,821	2,686	3,086	13,202	3,531	24	1,266	1,451	...	...	...	2,717	+ 838
Bury	16,129	4,971	7,162	7,504	35,766	33,250	303	(h) 7,037	6,026	825	2,472	(w) 11,193	27,553	+ 6,000
Chester	3,304	(i)1,834	1,318	2,256	8,712	4,540	130	(h) 2,748	1,018	...	904	...	4,670	...
Chesterfield ...	3,214	1,368	2,936	2,192	9,710	4,363	269	2,275	1,900	...	...	...	4,175	+ 457
Colchester	3,045	1,372	2,370	2,783	9,570	4,223	28	(h) 1,986	2,496	...	...	(i) 172	4,654	− 403
Croydon	31,319	(i 9,151	14,128	17,684	72,282	16,332	749	7,889	7,415	1,587	...	...	16,891	+ 190
Darlington... ...	4,273	896	1,895	2,103	9,167	4,545	160	1,926	2,006	101	1,202	...	5,235	− 530
Darwen	4,064	1,146	3,260	2,653	11,123	4,510	222	2,221	2,190	...	1,050	...	5,461	− 729
Derby	E 17,320 H 540	2,906 ...	5,499 81	8,610 ...	34,335 621	17,839 def. 173	239	6,236	3,464	...	5,536	(l) 185	15,421	+ 2,657
Doncaster	4,969	1,342	6,550	4,166	17,027	6,181	16	2,935	1,840	138	572	58	5,543	+ 654
Dundee	17,829	(i)7,398	7,445	10,686	43,358	24,916	...	8,990	6,700	323	7,842	...	23,855	+ 1,061
East Ham	19,381	6,796	14,558	10,884	51,619	8,613	...	5,279	6,858	...	...	...	12,137	− 3,524
Exeter	4,793	1,535	1,715	3,556	11,599	6,420	...	(h) 2,241	1,950	120	...	...	4,311	+ 2,109
Gloucester	7,250	1,643	2,975	1,836	13,704	4,103	...	(h) 5,362	1,881	370	...	...	7,613	− 3,510
Halifax	30,501	7,877	13,529	21,597	73,504	39,321	345	10,424	12,106	...	(y) 925	(i) 2,632	23,455	+ 16,211
Ilford	10,444	3,518	4,171	5,387	23,520	8,461	557	3,786	5,252	...	...	...	9,038	− 20
Ilkeston	2,262	789	1,378	1,460	5,889	1,197	160	1,450	1,532	90	...	96	3,168	− 1,811
Ipswich	8,801	1,962	5,033	3,494	19,290	3,999	(u) 4,877	(h) 3,660	2,207	...	3,421	(i) 237	9,525	− 649
Keighley	2,692	768	899	1,612	5,971	3,187	179	1,116	1,881	...	...	(n) 369	3,366	...
Kilmarnock ...	2,995	(i)801	1,434	1,636	6,866	1,751	5	(h) 1,863	1,110	...	1,160	...	4,133	− 2,377
Kirkcaldy	4,811	1,416	2,312	2,912	11,451	5,525	68	2,604	2,411	...	409	136	5,560	+ 33
Lancaster	2,207	(i)617	879	1,615	5,318	375	52	942	1,250	...	...	...	2,192	− 1,765
Leith	9,979	3,455	5,148	4,215	22,797	14,587	2,264	(h) 6,029	7,850	...	3,252	150	17,281	− 430
Leyton	(p) 22,360	8,611	13,711	12,923	57,605	13,084	133	10,007	8,461	...	...	202	18,670	− 5,453
Lincoln	1,446	656	967	872	3,941	2,611	47	1,529	1,071	...	...	(i) 6	2,606	+ 52
Liverpool	192,352	69,830	83,100	123,527	468,809	228,267	25,231	50,082	63,726	...	(d) 34,821	(e) 4,869	153,498	+ 100,000
Lowestoft	3,405	655	1,552	2,323	7,935	3,795	..	2,441	2,251	...	...	...	4,692	− 897
Maidstone	2,584	1,152	2,052	1,771	7,559	3,445	56	2,473	1,976	...	...	...	4,449	− 948
Manchester ...	273,002	(i)117,573	85,280	128,350	604,205	297,670	14,615	(h) 58,243	57,599	13,790	48,584	(e) 34,069	212,285	+ 100,000
Nelson	2,390	798	1,717	1,982	6,887	2,465	...	958	1,059	...	...	314	2,331	+ 134
Newport (Mon.) ...	10,429	4,234	9,655	6,638	30,956	11,748	857	5,694	4,357	...	1,886	(i) 668	12,605	...
Nottingham ...	48,272	14,674	17,408	30,692	111,046	68,269	...	16,444	21,121	...	...	(i) 2,040	39,605	+ 28,664
Oldham	27,159	10,158	28,025	19,742	85,084	28,730	1,639	16,158	11,734	2,347	...	(g) 5,799	36,038	− 5,669
Perth...	...	...	...	...	6,002	3,870	...	...	...	...	...	...	...	...
Plymouth	8,430	3,896	4,514	8,026	24,866	16,014	1,257	4,282	3,141	690	5,121	...	13,234	+ 4,037
Pontypridd ...	...	...	...	...	16,111	...	...	...	...	...	...	...	...	...
Rawtenstall ...	6,126	2,446	3,187	4,273	16,032	9,504	85	5,483	6,493	...	...	...	11,976	− 2,387
Rochdale	19,308	5,063	10,984	11,537	46,892	36,510	1,636	11,478	9,594	2,038	...	(i) (z) 10,752	33,862	+ 4,284
Rotherham... ...	E 11,039 RT ...	4,071 ...	5,864 ...	8,718 ...	29,692 ...	14,201 ...	195 ...	5,349 ...	3,465 ...	...	4,082 ...	... ...	12,896 ...	+ 1,500 ...
Salford	75,579	(i)24,562	27,778	48,819	176,748	81,229	4,477	15,791	668	4,112	492	(k) 29,378	51,441	+ 34,265
Southampton ...	21,466	(i) 6,862	9,433	12,545	50,306	20,732	(t) 6,757	7,564	7,557	952	5,000	...	21,073	+ 6,416
Southend-on-Sea	8,046	2,260	3,534	6,187	20,027	14,891	4,228	(h) 3,834	1,753	...	4,017	...	9,605	+ 9,514
Southport	4,922	(i)2,406	2,765	3,015	13,108	7,312	6,249	6,549	5,018	...	2,120	...	13,687	− 126
South Shields ...	9,249	(i)5,225	4,156	6,880	25,510	14,335	140	5,230	3,651	...	...	...	8,881	+ 5,594
Staly'dge, H., M., D.	12,818	(i) 5,022	7,448	5,761	32,049	5,571	...	7,485	7,786	...	400	397	16,068	− 10,497
Stockport	14,828	4,583	10,045	5,964	35,420	32,617	1,170	5,432	8,909	1,163	2,369	(j) 3,414	21,287	+ 12,500
Sunderland ...	19,807	5,608	4,867	11,267	41,549	34,066	265	(h) 6,464	10,374	1,218	10,875	400	29,331	+ 5,000
Swindon	2,854	828	1,534	1,850	7,066	1,845	45	1,215	1,422	...	...	...	2,637	− 747
Wallasey	18,736	(i) 6,704	6,213	10,801	42,454	22,051	1,249	5,520	5,072	...	...	634	11,226	+ 12,074
Walsall	8,510	3,326	4,315	5,670	21,821	12,268	1,339	4,962	3,975	551	640	...	10,128	+ 3,479
Walthamstow ...	14,417	2,972	8,845	8,546	34,780	7,009	30	(h) 6,427	3,468	...	...	(i) 712	10,607	− 3,568
Warrington ...	6,135	(i)2,556	2,996	3,323	15,010	7,882	481	2,418	3,447	...	...	...	5,865	+ 2,498
West Ham	52,659	†14,531	33,326	19,420	119,936	32,276	243	18,875	12,679	...	692	...	32,246	+ 273
West Hartlepool	4,791	1,586	2,956	2,241	11,574	7,931	3	2,569	1,847	...	..	(f) 500	4,916	+ 3,018
Wigan	17,340	5,252	12,768	10,817	46,177	31,200	331	(h) 13,866	13,101	...	...	3,662	30,629	+ 902
Wolverhampton ...	13,031	(i) 6,239	8,594	7,202	35,066	20,257	(x) 2,535	7,760	5,669	203	5,416	...	19,048	+ 3,744
Yarmouth (Gt.) ...	7,397	(i) 1,989	2,833	4,441	16,660	5,706	40	(h) 4,158	2,883	...	...	...	7,041	− 1,295
York	9,958	(i) 2,908	2,785	6,004	21,655	8,472	...	(h) 5,176	2,084	...	...	...	7,260	+ 1,212

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	75,752	17,245	35,294	28,622	156,913	113,325	...	48,342	31,277	1,478	17,879	2,164	101,140	+ 12,185
Bexley	3,282	1,382	*3,554	828	(s) 11,630	4,716	...	2,794	2,509	...	324	...	5,627	− 911
Birkenhead ..	15,923	(i)5,621	12,124	5,839	39,507	26,278	...	(h) 11,340	9,760	527	3,500	151	25,278	+ 1,000
Bournemouth .	22,933	7,998	9,095	15,040	55,066	47,280	955	(h) 10,587	16,535	...	...	i) 12,166	39,288	+ 8,947
Cardiff	43,914	11,332	26,879	26,593	108,718	67,323	1,123	23,925	22,645	2,272	6,947	2,655	58,444	+ 10,002
Coventry	13,626	4,333	9,005	3,564	30,528	14,876	137	8,521	5,755	...	...	(i) 634	14,910	+ 103
Glasgow	345,625	(i)193,837	144,530	51,995	735,987	340,891	65,826	78,797	105,492	22,790	172,310	14,377	393,766	+ 12,951
Huddersfield ..	33,571	(i)7,911	20,449	12,047	73,978	53,081	...	h) 12,536	13,061	2,274	15,575	1,235	44,681	+ 8,400
Hull	(i)58,137	12,634	31,909	11,622	114,302	48,728	...	16,578	13,883	576	3,117	...	34,154	+ 14,574
Leeds	115,601	40,347	43,609	28,577	228,134	205,805	7,837	47,174	57,773	7,356	11,928	(i) 7,844	132,075	+ 81,867
Leicester	59,052	11,397	22,836	25,322	118,607	51,628	1,660	24,218	13,764	2,801	10,741	1,284	52,808	+ 480
London	H. 4,737 E. 793,481	1,859 (r) 276,574	3,878 364,064	(m) 5,854 250,124	16,328 1,684,243	def. 5,527 704,803	... 47,425	330,301	405,605	32,102	1,541	(l) 15,851	785,400	− 33,172
N'castle-on-Tyne...	79,328	25,580	31,120	24,430	160,458	132,806	3,197	(h) 29,574	43,356	5,411	68	(i) 13,837	92,246	+ 43,757
Northampton ...	8,428	3,187	3,103	6,136	20,854	10,455	473	(h) 3,900	4,624	441	90	(ib) 1,221	10,276	+ 652
Portsmouth ...	31,414	(i)13,293	8,371	5,580	58,658	65,333	(a) 11,483	21,643	18,455	1,941	11,677	532	54,248	+ 22,568
Preston	12,350	4,989	9,252	2,995	29,586	16,360	...	3,625	5,038	...	...	1,356	10,019	+ 6,341
Reading	8,324	(i)4,356	4,313	3,643	20,654	16,028	11	6,709	5,062	263	...	...	12,034	+ 4,005
Sheffield	120,296	(i)31,784	45,385	49,365	246,830	147,701	2,056	31,747	42,504	5,567	30,017	8,014	117,849	+ 31,908
Wellington, N.Z....	57,973	7,775	21,918	17,947	105,613	52,644	2,091	19,865	4,757	...	14,682	...	39,304	+ 15,431

(a) Includes £10,703 balance forward from previous year. (b) Includes £152 loss on omnibus account less profit on parcel service. (c) Includes £1,611 insurance fund. (d) Includes reserve. (e) Includes rents for leased lines. (f) Rent of leased lines. (g) Rent of lines and deficit on motor omnibus account. (h) Including income tax. (i) Includes Army Service Allowance. (j) Includes £692 deficit on railless traction. (k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account. (o) Includes £1,337 through-running contributions. (p) Includes £407 horse account. (q) Includes National Insurance. (r) Including special charges. (s) Includes £2,584 through-running contributions to L.C.C. (t) Includes balance forward from previous year. (u) From borough fund. (w) Amount apportioned to leased lines. (x) Includes £1,554 profit on motor char-a-banc. (y) Parliamentary Expenses. (z) Includes £6,519 rent of leased lines. * Includes £1,913 spent on renewals. † Under a resolution of the Council, the allowances to employees [illegible] £2,950 profit from 3 months' working.

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Percentage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excludi'g Power Cost).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribution to Rates or Municip'l Funds.	Average Total per Car Mile. d.	Average Traffic per Car Mile. d.	Traffic. d.	General. d.	Repairs and Maintenance. d.	Power. (Price paid) d.	Total. d.	%	d.	Units.	Cost per Unit. d.	Units used per car mile.
Aberdeen ...	...	7,590	3,410	11·05	10·89	2·93	1·53	·99	1·03	6·48	58·54	5·45	2,317,204	·845	1·027
Accrington ...	...	...	1,568	12·64	12·49	3·17	1·18	·94	2·04	7·33	57·99	5·29	949,054	1·23	1·65
Ashton-u-Lyne	47	...	3,050	12·4197	12·0692	2·6622	·8695	1·5788	1·7434	6·8539	55·19	5·1105	640,413	1·25	1·38
Ayr...	...	...	...	9·61	9·18	2·50	1·25	·79	1·33	5·87	63	4·47	442,969	1·26	·98
Birmingham ...	30,000	17,596	...	10·910	10·793	3·169	1·459	1·451	1·912	7·991	73	6 079	24,186,574	1·125	1·7
Blackburn ...	...	...	...	13·81	13·71	3·40	1·25	2·92	1·91	9·48	68·70	7·57	1,739,274	1·3	1·54
Blackpool ...	...	1,736	12,000	16·82	16·65	3·90	1·71	2·04	2·26	9·91	58·93	7·65	1,552,635	1·58	1·43
Bolton	58	...	17,000	11·758	11·656	2·498	·788	1·323	1·721	6·330	53·836	4·610	4,514,010	1·1	1·56
Bradford	...	14,610	10,000	12·425	11·816	3·457	1·041	2·450	2·027	8·975	74·60	6·948	12,272,121	1	1·926
Brighton	18	...	...	12·240	11·782	3·064	1·464	2·964	1·816	9·308	72·79	7·10	1,676,770	1·2	1·51
Burnley	...	...	1,664	11·450	11·259	3·085	1·108	1·334	2·620	8·147	71·16	5·53	3,621,567	1·15	2·20
Burton-on-Trent	838	...	...	9·13	8·30	3·06	·99	1·47	1·68	7·20	78·5	5·28	530,080	1·39	1·04
Bury	...	(k)1,000	5,000	10·26	10·22	2·399	·776	1·253	1·268	5·696	51·82	4·428	2,045,692	1·25	1·26
Chester	...	...	...	9·16	8·94	2·28	1·27	·92	1·56	6·03	66	4·39	414,118	1·33	1·19
Chesterfield ...	...	457	...	11·1	10·8	2·54	1·08	2·31	1·73	7·66	68·9	5·93	420,824	1·25	1·38
Colchester ...	...	...	...	9·942	9·668	2·194	·989	1·709	2·006	6·898	69·24	4·892	445,214	1·5	1·34
Croydon	...	190	...	7·593	7·526	2·683	·784	1·211	1·516	6·194	78·68	4·493	3,000,308	1·416	1·071
Darlington ...	...	...	...	8·487	8·326	2·645	·554	1·172	1·304	5·675	66·85	4·371	504,546	1	1·301
Darwen	...	...	...	14·02	13·13	3·65	1·03	2·93	2·38	9·99	71·15	7·61	485,033	1·312	1·812
Derby	(n) 75	...	...	E 10·358 H. 6·077	10·150 5·821	3·438 7·325	·577 ...	1·092 1·099	1·709 ...	6·816 8·424	65·8 138·6	5·107 ...	1,425,112 ...	1·45 ...	1·179 ...
Doncaster ...	...	654	...	10·52	10·37	2·24	·61	2·97	1·90	7·72	73·1	5·82	799,965	1·25	1·51
Dundee	...	61	1,000	11·802	11·465	3·082	1·278	1·288	1·847	7·495	63·5	5·648	2,564,659	1	1·847
East Ham ...	..	...	...	9·05	8·95	2·91	1·02	2·19	1·63	7·75	85·70	6·12	2,461,677	1·062	1·54
Exeter	...	2,109	...	9·629	9·60	2·560	·821	·917	1·900	6·198	64·37	4·298	615,956	1·375	1·38
Gloucester ...	...	...	...	6·84	6·41	2·78	·63	1·14	·71	5·26	77	4·55	470,336	1	·70
Halifax	...	(r) 7,483	(s)6,171	11·657	11·514	3·141	·812	1·393	2·225	7·571	65	5·35	4,607,293	1·125	1·98
Ilford	...	...	...	8·127	8·006	2·846	·729	1·164	1·109	5·848	73·6	4·60	1,131,616	1·125	1·172
Ilkeston	...	...	...	7·04	6·87	2·3	·8	1·3	1·4	5·8	83	4·4	372,200	1	1·54
Ipswich	...	...	...	8·705	8·52	3·290	·732	1·882	1·306	7·210	82·83	5·904	670,809	1·25	1·045
Keighley	...	...	...	9·064	8·754	2·664	·761	·890	1·595	5·910	65	4·315	254,636	1·5	1·05
Kilmarnock ...	...	...	...	7·413	7·240	2·569	·695	1·235	1·408	5·907	79·6	4·499	314,191	1·25	1·13
Kirkcaldy ...	33	...	...	9·085	8·864	2·574	·758	1·238	1·558	6·128	67·4	4·57	698,804	1	1·558
Lancaster ...	...	...	...	8·10	7·80	3·11	·87	1·242	2·28	7·50	92·57	5·22	227,984	1·7	1·34
Leith	...	...	...	9·26	8·99	2·47	·86	1·27	1·03	5·63	60·98	4·60	984,428	1·027	1·02
Leyton	...	...	...	9·355	9·151	(c) 2·959	1·140	1·815	1·710	7·624	81·338	5·914	3,043,900	1·019	1·678
Lincoln	52	...	...	10·59	10·40	2·34	1·06	1·56	1·41	6·37	60·2	4·96	173,895	1·25	1·128
Liverpool ...	...	...	100,000	12·25	12·02	3·380	1·227	1·460	2·171	8·238	65·6	6·067	26,007,694	1·14	1·9
Lowestoft ...	...	...	...	9·1	8·8	2·60	·5	1·2	1·8	6·1	67·64	4·3	318,601	1·75	1·03
Maidstone ...	...	...	...	8·77	8·295	2·04	·90	1·63	1·40	5·97	71·96	4·57	366,191	1·125	1·217
Manchester ...	...	...	100,000	11·300	11·123	3·420	1·473	1·069	1·608	7·570	63·47	5·962	29,922,197	1·029	1·562
Nelson	134	...	...	11·66	11·60	2·98	·99	2·14	2·48	8·59	74	6·11	241,886	2	1·26
Newport (Mon.).	...	...	...	10·622	10·385	2·594	1·053	2·402	1·651	7·700	72·49	6·049	1,178,500	1·30	1·22
Nottingham ...	...	6,164	22,500	11·35	11·16	3·06	·93	1·10	1·94	7·03	62·78	5·09	5,806,688	1·25	1·53
Oldham	...	...	...	13·351	13·101	3·186	1·191	3·288	2·316	9·981	74·75	7·665	3,158,752	1·5	1·544
Perth	...	...	...	9·39	8·51	3·08	·40	·77	1·46	5·71	60·79	4·25	295,846	1·25	1·17
Plymouth ...	...	...	4,037	12·066	11·450	2·42	1·11	1·29	2·298	7·12	60·83	4·82	1,159,069	1·66	1·38
Pontypridd ...	...	...	...	13·29	13·11	2·82	3·67	·74	1·84	9·07	68·26	7·23	627,593	1·25	1·47
Rawtenstall ...	...	...	...	10·11	9·699	2·40	·99	1·27	1·69	6·35	62·57	4·66	833,714	1·23	1·37
Rochdale	4,284	...	...	11·292	11·134	2·611	·682	1·524	1·654	6·471	56·2	4·817	2,836,062	1·006	1·694
Rotherham ...	E. ... R.T....	...	1,500 ...	12·37 ...	12·37 ...	3·11 ...	1·15 ...	1·65 ..	2·46 ...	8·37 ...	67·65 ...	5·91 ...	1,669,691 ...	1·25 ...	1·96 ...
Salford	...	12,265	22,000	10·623	10·622	3·112	1·011	1·144	2·050	7·317	66	4·972	9,602,534	1·22	1·667
Southampton ...	1,282	...	5,134	...	...	...	...	...	...	...	...	...	...	...	...
Southend-on-Sea	2,514	1,000	6,000	13·14	12·97	3·03	·85	1·33	2·33	7·54	57·35	5·21	848,538	1·75	1·33
Southport ...	...	...	...	10·303	10·227	2·483	1·213	1·395	1·521	6·612	63	4·958	465,241	1·5	·977
South Shields ...	...	3,194	2,400	10·308	10·160	2·392	1·352	1·075	1·780	6·599	62·4	4·652	1,200,086	1·353	1·293
Stalybridge, &c.	...	...	...	8·084	8·056	2·755	1·079	1·600	1·453	6·887	83·15	5·269	1,803,063	·9	1·614
Stockport .		250	12,250	10·958	10·745	2·388	·738	1·618	·961	5·705	47·94	4·744	...	...	...
Sunderland ...	...	...	5,000	12·210	12·148	3·198	·905	·786	1·820	6·709	54·75	4·8	1,802,694	1·5	1·21
Swindon	...	...	...	9·62	9·24	3·06	·89	1·65	1·99	7·59	79·29	5·60	277,568	1·6	1·24
Wallasey ...	...	4,500	(u) 8,000	12·048	11·896	3·499	1·252	1·160	2·018	7·929	68·8	5·911	1,851,649	1·4	1·44
Walsall	2,479	...	1,000	11·353	11·094	2·834	1·108	1·437	1·888	7·267	64·012	5·379	838 649	1·68	1·164
Walthamstow ...	...	...	...	8·75	8·66	3·02	·62	1·85	1·79	7·28	83·23	5·49	1,491,700	1·375	1·3
Warrington ...	2,498	...	...	12·334	12·193	3·305	1·377	1·615	1·790	8·087	64·22	6·208	531,700	1·5	1·193
West Ham ...	...	273	...	9·713	9·427	3·359	1·314	2·127	1·239	8·039	78	6·41	6,306,731	·75	1·66
West Hartlepool	...	3,018	...	9·77	9·52	2·39	·79	1·49	1·13	5·80	59	4·67	680,972	·78	1·42
Wigan	902	...	...	12·415	12·077	2·791	·866	2·052	1·736	7·445	59·70	5·80	2,186,073	1·187	1·461
Wolverhampton	...	...	3,744	11·239	11·091	2·648	1·267	1·746	1·463	7·124	62·5	5·661	1,712,796	1	1·45
Yarmouth (Gt.).	...	...	...	7·927	7·752	2·618	·704	1·008	1·575	5·905	76·17	4·30	708,756	1·50	1·046
York	...	1,212	...	9·45	9.31	3·11	·92	·88	1·89	6·80	71·87	4·91	...	...	...

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

									*					Works Cost.	
Belfast	...	...	12,185	10·08	9·93	2·83	·64	1·32	1·07	5·86	58·07	4·79	10,439,797	·658	1·39
Bexley	...	..	...	11·13	12·3	2·53	·85	2·82	·68	6·88	71·1	6·20	487,110	·827	1·66
Birkenhead ...	...	1,000	...	13·058	12·922	3·161	1·115	2·406	1·160	7·842	59·99	6·67	2,341,009	·60	1·936
Bournemouth ..	...	8,947	...	13·52	13·46	3·03	1·05	1·20	(b) 1·99	7·27	53·80	5·28	3,072,169	·65	1·69
Cardiff	10,002	...	...	12·354	12·14	3·843	·992	1·358	·835	7·028	59·1	6·193	4,936,582	·475	1·80
Coventry ...	103	...	...	9·902	9·734	2·971	·945	1·964	·778	6·658	67·2	5·88	1,651,950	·502	1·47
Glasgow	...	...	12,951	10·674	10·612	3·426	1·922	1·432	·515	7·295	59·87	6·266	33,848,947	·366	1·40
Huddersfield ...	8,400	...	...	11·05	10·79	2·92	·70	1·78	1·04	6·44	58·22	5·40	5,398,258	·49	1·93
Hull	...	4,574	10,000	8·61	8·53	2·87	·66	1·68	·61	5·82	67·58	5·26	6,352,263	·44	1·40
Leeds	...	...	81,567	10·936	10·834	2·914	1·016	1·099	·720	5·749	52·57	5·029	18,862,847	·668	1·918
Leicester ...	...	...	480	9·875	8·682	3·425	·661	1·325	1·469	6·880	69	5·411	7,540,856	·420	1·82
London	...	...	...	E. 9·77 H. 9·51	9·50 9·03	3·24 4·17	1·14 1·64	1·49 3·41	1·02 5·15	6·89 14·37	68·78 151·17	5·69 14·37	152,666,477 ...	·615 ...	2·60 ...
N'castle-on-Tyne	...	25,757	18,000	12·187	11·642	3·297	1·063	1·293	1·015	6·668	53·02	5·653	11,259,266	·382	1·968
Northampton ...	...	652	...	10·89	10·70	2·94	1·10	1·08	2·13	7·25	68	5·12	1,189,423	1·24	1·57
Portsmouth ...	6,568	(i) 6,000	10,000	12·201	11·997	3·092	1·308	·824	·549	5·773	45·88	5·050	3,272,089	·483	1·139
Preston	...	5,041	1,300	10·75	10·54	2·890	1·168	2·164	·700	6·922	64·40	6·222	1,765,250	·407	1·49
Reading	...	1,005	3,000	9·520	9·242	2·165	1·151	1·119	·945	5·360	54·55	4·248	1,180,507	·740	1·15
Sheffield	...	9,032	22,876	10·747	10·666	3·277	·866	1·236	1·345	6·724	61·116	5·379	18,329,775	·646	1·979
Wellington, N.Z.	15,431	...	...	16·309	16·189	5·974	·801	2·259	1·850	10·884	65·86	9·034	4,769,149	·906	2·05

Digitized by Google

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Car Mileage.	Passengers Carried.	Passengers Carried per Car Mile.	Average Fare per Passenger. d.	Average Journeys per Head of Populat'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track. £	Average Traffic Revenue per Annum per Head of Populat'n Served.	Operating Expenses per Passenger. d.	Average Distance of 1d. Fare. Miles.	Average Fare Charged per Mile. d.	Average Speed per Hour. Miles.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
			Traffic Records.													
Aberdeen ...	165,000	1,909,009	24,048,816	12·59	·86	145·8	90	3,121	10/6	·514	1·861	·57	7·6	812	63	83
Accrington...	45,525	573,536	4,998,979	8·72	1·377	109·8	105	3,033	13/1	·84	1·07	·929	7·5	250	18	27
Ashton-u-L.	50,000	464,160	5,053,701	10·888	·648	173·09	106	2,851	9/4	·368	1·223	·81	8	190	12	25
Ayr	33,000	448,725	4,019,771	8·96	1·02	122	103	1,832	10.5	·65	1·25	·75	8	168	12	22
Birmingham	870,000	14,232,902	149,443,199	10·5	1·03	171·8	86·63	5,384	14.9	·76	...	...	...	...	...	..
Blackburn ...	200,000	1,121,769	12,223,569	10·89	1·28	61·12	105	2,528	6/6	·902	1·25	·76	7·50	434	31	61
Blackpool ...	67,500	1,085,655	13,624,514	12·55	1·32	201·8	103	4,370	22/4	·79	...	...	8	...	29	84
Bolton ...	221,000	2,886,180	31,370,166	10·86	1·066	141·49	124·07	2,920	12/8	·582	1·553	·633	7·25	980	70	112
Bradford ...	370,000	6,194,087	70,077,271	11·31	1·059	189	113	2,807	16/6	·84	1·66	·830	7·3	2,402·5	155	252
Brighton ...	133,936	1,108,382	11,837,828	11	1·10	88·38	76·08	3,165	8/1½	·83	1·27	·787	6·41	512	32	53
Burnley ...	175,000	1,644,712	15,867,699	9·65	1·16	96	120	3,544	8/10	·88	1·25	·83	7	798	42	67
Burton ...	48,000	440,021	3,311,355	7·53	1·06	69	...	1,790	6/4	·95	1·505	·88	7·5	...	...	20
Bury	128,202	1,613,387	15,513,264	9	1·07	121·47	99·73	1,904	10/9	·554	1·30	·77	8·54	...	...	54
Chester ...	39,028	347,318	3,275,944	9·43	·95	83·9	95	2,009	6/5	·64	1·27	·8	7	144·57	10·04	18
Chesterfield	50,000	304,376	2,950,774	9·7	1·1	76	122	2,668	5/5	·78	1·38	·75	7·33	126	7	17
Colchester ...	65,000	332,963	2,434,786	7·31	1·32	37·46	86·80	1,689	4/1	·94	·88	·96	6·77	147·14	10·51	18
Croydon ...	181,956	2,803,883	19,847,402	7·08	1·062	109·08	128	4,983	9/9	·850	2·15	·50	8·23	933·60	60	75
Darlington...	62,383	387,714	4,234,783	10·9	·76	62·15	96·5	1,499	4/4	·52	1·219	·45	6·68	151·25	11	18
Darwen ...	...	267,670	2,741,987	10·24	1·28	...	...	2,045	...	·97	...	...	...	...	...	...
Derby ...	124,000	E 1,206,880 H. 17,710	12,136,148 110,231	10·039 6·224	1·011 ·935	97·88	...	2,398 ...	8/3 ...	·67 1·35	1·44 1	·75 1	6·375 ..	... ...	... ...	50 3
Doncaster ...	60,000	529,122	5,747,273	10·86	·955	95·79	93·9	1,798	7/7	·711	1·25	·76	7·5	239	18	32
Dundee ..	165,000	1,388,345	18,753,140	13·50	·851	113	...	2,345	8/–	·544	2	·50	7·3	...	...	72
East Ham ...	145,000	1,596,984	18,916,971	11·84	·75	130	...	4,192	8/2	·65	1·71	·63	...	...	..	...
Exeter ...	48,660	449,103	4,611,444	10·27	·93	95	...	2,566	7/4	·603	...	...	...	...	...	24
Gloucester ...	53,972	624,402	4,358,510	7	·92	81	90·60	1,113	6/2	·75	1·5	·65	7·08	250·8	19	30
Halifax ...	176,000	2,330,104	20,707,071	8·89	1·27	118	81·76	2,015	12/8	·852	1·553	·82	7·23	883·74	78	101
Ilford ...	88,000	945,433	9,203,077	10·48	·78	104·6	...	2,462	7/2	·613	1·543	·69	8	...	...	27
Ilkeston ...	32,000	241,548	1,746,382	7·2	·95	...	90	1,942	52/8	·8	1·50	·5	7	101	7	13
Ipswich ...	76,472	642,092	5,610,332	8·73	·975	73·4	64·4	1,532	6/–	·82	1·53	·693	5·47	322·56	20·16	36
Keighley ...	43,000	242,500	3,099,272	12·8	·68	72·06	55·35	1,447	4/1	·462	2·22	·45	6·87	126	7	12
Kilmarnock	36,000	278,987	2,311,708	8·28	·87	64·2	96·83	1,507	4/8	·712	1·13	·86	7·22	98·03	7·88	14
Kirkcaldy ...	39,600	448,469	5,492,120	12·24	·723	138	49	1,882	8/4	·5	1·522	·64	7	158	17	22
Lancaster ...	41,908	170,337	1,559,037	9·15	·852	37·20	75	1,153	2/8	·812	1·71	·5	8	84·7	6·05	12
Leith ..	110,500	968,808	10,220,069	10·55	·85	92·5	126	2,017	6/7	·53	1·32	·72	8·4	315	21	37
Leyton ...	124,735	1,813,462	17,472,882	9·64	·950	140	120	3,820	11/1	·791	1·77	·95	8·25	14·5	40·0375	60
Lincoln ...	20,000	148,440	1,713,542	11·5	·89	85·67	59·3	2,169	6/5	·552	1·75	·428	7	72	4	8
Liverpool ...	840,000	13,657,888	145,656,374	10·67	1·127	173·40	89·09	5,516	16/3	·772	2·514	·39	7·75	5,040	420	596
Lowestoft ...	35,000	307,838	2,706,348	8	1·07	77·32	70·25	2,787	6/6	·703	1·5	·7	5·75	192	12	19
Maidstone ...	25,000	300,945	2,423,514	8·053	1·03	96·94	82	1,478	8/4	·741	1	1	6·8	128	12	19
Manchester	957,500	19,155,051	202,768,420	10·6	1·06	212	93·5	4,835	18/7	·717	2·514	...	7·75	7·2	561	683
Nelson ...	45,000	192,378	2,484,775	12·92	·85	55·22	87·84	2,407	4/2	·665	1	1	5·5	108	6	11
Newport ...	90,000	964,895	9,410,109	9·75	1·09	104	...	2,909	9/3	·79	1·164	·898	...	...	...	44
Nottingham	264,000	3,789,857	41,210,964	10·87	1·02	156	95·28	3,984	13/4	·646	1·75	·442	6·92	...	109	155
Oldham ...	180,000	2,045,540	22,171,712	10·837	1·19	123·176	...	3,018	12/4	·92	1·13	·863	7	...	...	97
Perth... ...	35,900	252,216	1,844,588	7·31	1·16	51	...	1,289	5/–	·78	...	...	...	...	...	...
Plymouth ...	112,000	838,142	9,333,087	11·13	1·027	83·33	...	2,666	7/2	·639	...	...	...	...	...	42
Pontypridd...	50,000	426,228	5,577,666	13·09	1	111	...	2,707	9/4	·69	...	...	...	...	...	...
Rawtenstall	40,000	605,485	4,869,792	8·04	1·21	122	111	1,540	12/3	·79	1·121	·88	8·50	247·5	15	24
Rochdale ...	130,000	1,772,546	14,286,607	8·06	1·387	109·90	110·30	2,085	11/11	·78	1·07	·90	7·33	660	44	69
Rotherham...	64,000	E 850,548 H T ...	9,828,838 ...	11·55 ...	1·07 ...	153·6 ...	... ...	3,645 ...	13/1 ...	·72 ...	... ...	... ...	... ...	... ...	... ...	... ...
Salford ...	350,000	5,828,238	54,343,908	9·324	1·134	155	104	3,403	14/9	·78	2·20	·46	7·916	2,065·5	153	200
Southampt'n	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Southend ...	78,000	637,366	7,581,104	11·89	1·09	97·2	87	4,708	8/10	·634	1·41	·76	6·5	357	21	31
Southport ...	31,312	475,680	4,772,478	10·033	1·004	152·41	100	1,850	12/9	·7	1·6	·7	6·65	225	15	27
So'th Shields	110,600	927,728	10,479,421	11·296	·899	91	126	3,826	7/1	·58	3·1	·38	7·71	285	20	40
Stalybridge	94,091	1,116,936	8,406,915	7·706	1·06	89·3	...	1,353	8/–	·905	1·22	·72	6·8	...	...	60
Stockport	120,000	1,490,116	...	...	...	...	...	2,356	11/2	...	...	...	..	...	...	...
Sunderland	170,000	1,486,201	18,619,364	13·2	·97	109·5	78·3	3,696	8/10	·536	1·34	·68	7	688	43	70
Swindon ...	53,000	223,383	2,392,470	10·71	·859	45·14	75	1,955	3/4	·709	1·2	·85	6	...	...	12
Wallasey ...	87,000	1,284,938	13,555,876	10·54	1·15	153·51	99·2	3,190	14/8	·75	1·89	·54	7	388·53	35·5	67
Walsall ...	100,000	720,634	6,752,727	9·371	1·184	68	94	1,905	6/7	·775	1·24	·79	7	315	21	39
Walth'mst'w	130,000	1,146,743	13,499,838	11·77	·732	103	104	3,089	6/4	·618	1·18	·86	7·6	430	37	38
Warrington	86,000	445,459	6,012,212	13·474	·903	69·91	102·24	2,344	5/3	·59	1·246	·803	6·39	180·99	11·937	21
West Ham ..	296,570	3,760,361	42,667,561	11·35	·852	144	90	5,041	10/–	·67	1·85	·50	7·66	1,195·75	93	118
W. Hartlep'l	90,000	479,382	4,261,917	8·89	1·07	47	94	2,163	4/3	·65	1·262	·94	7	203	14	26
Wigan ...	200,000	1,495,786	13,811,709	9·23	1·344	69	97·57	2,427	7/6	·802	1·15	·88	7·4	567	42	73
Wolverh'ton	135,000	1,181,309	12,236,785	10·359	1·06	90·64	89	2,539	8/1	·687	1·25	·879	6·85	651·6	36·2	52
Yarmouth ...	56,000	677,153	4,236,424	6·25	1·239	75·65	80	1,500	7/10	·944	1·25	·76	7	310	23	35
York	82,600	762,540	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast ...	390,000	6,432,600	62,340,269	9·74	1·02	159	128	2,689	13/8	·60	1·96	·43	8·75	2,014	241	290
Bexley ...	16,500	316,970	2,270,070	7·16	1·55	133	126	2,922	19/10	1·24	1·59	·63	9·5	179	11	16
Birkenhead	137,996	1,209,117	14,822,697	12·25	1·052	107·41	73·46	2,702	9/3	·992	1·39	·66	6·84	483·81	45·09	65
Bournem'uth	120,000	1,815,632	16,967,210	9·34	1·44	141	...	3,103	16/11	·78	1·19	·87	6·8	...	...	91
Cardiff ...	182,729	2,742,846	30,424,407	11·09	1·09	166	85	4,358	15/2	·85	1·44	·736	7·5	1,408	88	130
Coventry ...	135,000	1,100,553	8,730,024	7·9	1·22	65	59	2,832	6/7	·84	1·18	·866	6·2	487	41	51
Glasgow ..	1,150,000	24,214,460	336,260,758	13·887	·764	292·4	105·61	5,404	18/7	·488	2·31	·44	8·11	8,974·78	628·20	856
Huddersfield	160,000	(a) 2,797,276	23,933,065	8·69	1·24	159	84	3,556	15/6	·73	1·34	·69	7·72	1,012·16	63·26	106
Hull	291,118	4,551,145	52,087,770	11·44	·745	178·92	123·43	4,879	11/1	·52	2·75	·364	9	1,565·60	97·85	180
Leeds ...	525,000	9,522,737	95,639,268	10·04	1·075	182	115·43	3,747	16/4	(b) ·884	1·93	·539	7·54	3,465	230	345
Leicester ...	232,644	4,137,262	37,914,773	9·146	·947	163	108·35	4,045	12/10	·751	2·18	·45	8	1,451	...	160
London ...	...	E 58,706,161 H 272,631	547,253,332 3,244,661	9·32 11·90	1·02 ·76	... ...	117·07 77·12	8,465 1,045	... ...	·73 1·21	... ...	... ...	8·95 5·85	17,972 131·80	1,374 10	1,730 37
Newcastle ...	300,000	5,775,323	65,085,452	11·27	1·073	217	...	4,454	18/8	·592	1·58	·633	...	...	...	223
Northampt'n	91,500	690,177	8,295,941	12·02	·89	90·66	...	2,470	6/8	·603	1·34	·7	...	...	...	33
Portsmouth	246,000	2,438,621	27,554,194	11·299	1·061	112·01	90·29	3,535	9/1	·495	1·66	·62	7	1,065	74	100
Preston ...	120,000	1,025,738	10,340,688	10·08	1·04	86·17	132	2,652	7/7	·764	1·01	·95	7·36	404·7	21·3	33
Reading ...	76,500	924,696	8,881,097	9·6	·96	116	114	2,704	9/4	·54	1·59	·68	7·5	336	25	36
Sheffield ...	485,228	8,810,252	107,023,195	12·147	·878	220	108·86	4,950	16/2	·553	2·917	·371	...	3,215·05	221·728	339
Wallington...	70,000	2,328,849	24,565,376	11·28	1·43	359	85	4,708	44/10	1·031	1·125	·89	7·15	840	75	92

Digitized by Google

COLONIAL TRAMWAYS AND INCOME TAX.

Sir J. D. Rees asked the Chancellor of the Exchequer in the House of Commons on January 24 whether he was aware that the Bombay Tramways Company, in order to avoid the payment of double income-tax, was removing its headquarters from London to Bombay; whether he was aware that many Colonial companies paid a triple income-tax; and whether, in view of the probable removal of many more companies and the net loss involved to the trade and revenue of the United Kingdom, he would endeavour to adjust this grievance in his forthcoming Budget.

Mr. McKenna.—My hon. friend refers to a company which I understand operates a system of tramways outside the United Kingdom, one which is owned predominantly by persons resident in India. These circumstances suggest that considerations other than the incidence of the British income-tax may have influenced the company in its decision.

Evidently the Chancellor of the Exchequer is unaware that the chairmen of several Colonial tramways companies, whose offices are in London, have referred to the payment of double income-tax at their recent annual meetings, and expressed a hope that the injustice may be removed. They base their hopes upon a statement made by the Chancellor to the effect that on the first opportunity after the war the Government would take the opportunity of re-forming income-tax law.

Further enlightenment for the Chancellor is afforded by the report of a meeting of Bombay Electric Supply and Tramways Company held in Bombay, when a resolution was passed to transfer the entire administrative control and management from London to Bombay, in order to escape the liability to pay the British income-tax. Sir Sassoon David, chairman of the company, in introducing the subject, said :—" The directors have on more than one occasion striven to obtain, by means of a deputation to the Chancellor of the Exchequer and by other means, relief from this hardship. So far these efforts have not proved successful, although the directors have recently been informed that prior to the outbreak of the war a Committee of the House of Commons had been appointed to report upon the revision of the Income-tax Acts. When the labours of that Committee will be resumed, or what may be their outcome, I am not in a position to inform you. They may, and we hope will, result in relief being granted in the case of English companies which, like our own, earn their entire profits outside of the United Kingdom. But I feel bound to tell you that, in my opinion, any relief, if it be hereafter granted by the British Legislature, will only be partial. Taking the English income-tax as it stands to-day, it means, we estimate, that the company will have to pay a sum of considerably over Rs.2,00,000 on account of that tax, which represents a loss divided between its preference and its ordinary shareholders, and that the following year, even should the tax not be raised above 3s. 6d. in the £, it will have to pay more. Put another way, the present English tax of 17½ per cent., plus the Indian tax of 2¾ per cent., is equivalent to a charge of 20 per cent. per annum on the company's profits, although as a matter of fact these taxes do not really amount to quite that percentage owing to allowances granted for depreciation of plant."

CONTRACTS AND ORDERS.

British Electric Transformer Company have received a contract for the supply of transformers to Liverpool Corporation.

British Westinghouse Company are supplying and erecting a 500-KW. rotary converter set to Salford Council, at £1,450.

Nelson Council have accepted the tender of Messrs. Briggs, Jones and Gibson, of Manchester, for five uniforms for women car conductors.

Southampton Council have placed a contract with Messrs. Driver and Company for the supply of 60,000 deal blocks for the Tramways department.

Bournemouth Tramways Committee have accepted the tender of Walter Macfarlane and Co., at £122 10s., for erecting a shelter at the Poole terminus.

W. T. Henley's Telegraph Works Company have received a contract to supply triple concentric cable and joint boxes to Ilford Council, at £2,319.

C. Mackintosh and Company, Limited, have obtained a contract for mackintoshes and waterproofs for various departments of the Liverpool Corporation.

Sunderland Council have allotted contracts as subjoined :—Ferranti, Limited, meters; Underfeed Stoker Company, Limited, two Underfeed stokers.

Messrs. Burt and Timms have obtained a contract for the construction of permanent way for the Melbourne, Brunswick and Coburg Tramways Trust, at £27,863.

West Bromwich Council have received a recommendation from the Electricity Committee to accept the tender of the New Conveyor Company for an extension of the coal conveyor.

The Acetylene Illuminating Company have received an order from Swindon Council for an acetylene gas plant at a cost of £41, for use in connection with the repair of the tramway track.

Sydney Council have placed contracts as subjoined :—N. Gutheridge, 2,000-KW. Bruce-Peebles motor converter, £8,737; Babcock and Wilcox, Limited, extension of suction ash handling plant.

Rotherham Council have placed the following contract with J. Smith and Company, Limited, Derby :—Inspectors' trousers, 15s. per pair; tunics, 26s.; motormen and conductors' trousers, 11s. 6d. per pair; jackets, 20s.

Salford Tramways Committee have accepted the following tenders :—Brown Bayley's Steelworks, Limited, supply and delivery of 300 steel tramcar tires; Hadfields, Limited, supply and delivery of 14 manganese steel crossings.

British Insulated and Helsby Cables, Ltd., have been awarded a contract to supply, deliver, and erect an overhead line for Nuneaton Electricity Committee, at £436 11s. It is to be of copper, all aluminium having been withdrawn from the market.

Increased Charge for Tickets.—The contractors for the supply of tickets to Colchester Tramways department having refused to execute an order for 300,000 urgently required, unless an additional 1d. per 1,000 was paid, the Tramways Committee have paid the additional amount under protest.

Barnsley Council have accepted the following tenders for extensions to the generating station :—Willans and Robinson, Limited, turbine, £2,590; Dick, Kerr and Company, Limited, alternator, £1,980; Willans and Robinson, Limited, condenser, £2,150; British Insulated and Helsby Cables, Limited, high-tension and low-tension feeders, £2,241.

British Thomson-Houston Company have received an order from Bradford Electricity Committee for a spare rotor for the 3,000-KW. turbo-generators at the electricity works, for an induction motor installation from Chesterfield Council, subject to a loan being sanctioned, and for a motor starter for a 2-ton electric capstan from Bristol Corporation Docks Committee.

Cape Town Municipality have placed a contract with the South African General Electric Company for supplying a British Thomson-Houston turbo-alternator, at £12,160, and with Messrs. Sykes and Company for supplying a motor converter at £3,050, made by Messrs. Bruce Peebles and Company, Limited, who have supplied two similar machines to Cape Town Council.

Leicester Electricity Committee have recommended the acceptance of the following tenders :—Siemens Bros. Dynamo Works, Limited, 1,000-KW. rotary converter and switchgear cables, etc., £2,450; British Electric Transformer Company, Limited, set of 100-KW. transformers, one spare transformer, one 75-KW. single-phase transformer, and one 50-KW. single-phase transformer, £312; G. Fletcher and Company, Limited, coal-handling plant, £1,952.

Stockport Council have placed contracts for tramway supplies as appended :—Hex. nuts, glue, bolts and nuts, Baxendale & Co.; timber, birch floor laths, lifeguards laths, Wilson, Roscoe and Robinson; steel banding wire, British Westinghouse Company; field coils for motors, Dick, Kerr and Company, Limited; bell pushes, P. and B. tape, L. Andrew and Company; hand slipper bracket castings and car step bracket castings, Malleable Steel Castings Company.

Manchester Electricity Committee have allotted tenders as follows :—Musgrave and Company, Limited, set of induced-draught plant; Worthington Pump Company, Limited, steam turbine-driven boiler feed pump; Mather and Platt, Limited, two electrically-driven circulating water pumps; Babcock and Wilcox, Limited, London, coal-conveying plant; Klein Engineering Company, Limited, water cooler; Marple and Gillott, Limited, railway track and crossing; F. Morton and Company, Limited, steelwork, etc., required in boiler-house No. 3; F. Mitchell and Company, Limited, foundations for new cooling towers and boiler-house.

Shepherd's Parging Block Company, Limited, of Milkstone, Rochdale, inform us that the following among other tramways are now using their parging blocks :—Belfast, Bexley, Blackburn, Bolton, Bradford, Burnley, Chester, Colne, Coventry, Darwen, Eccles, Haslingden, Haywood, Ilkeston, Liverpool, Maidstone, Milnrow, Nelson, Oldham, Portsmouth, Preston, Rawtenstall, Rochdale, Rotherham, Salford, Sheffield, Stalybridge, West Hartlepool, Wigan Corporation; St. Annes and Lytham Tramways, South Lancashire Electric Tramways, and Yorkshire Electric Tramways. Orders are also in hand from Doncaster, Gloucester, and Scarborough Corporations.

Extension of Keighley Railless Trolley Installation.—Keighley Council have adopted the Tramways Committee's recommendation to accept the offer of Messrs. Clough, Smith and Company, Limited, to construct the overhead equipment for trolley vehicles from the terminus in Hebden Road, Haworth, to Lowertown, Oxenhope, capital payment to be suspended until six months after the end of the war. The materials will be from the experimental line erected at Hove by "Cedes" Electric Traction, 112, Great Portland Street, London, the price being very favourable in view of the present high cost of materials and labour. The Local Government Board have extended the period for the completion of the overhead equipment on the Oxenhope route until August 7, 1917.

Digitized by Google

PERSONAL.

Mr. J. B. Feltham, chief assistant in Gloucester Corporation electricity works, has been appointed electrical engineer to Mexborough Council.

Mr. S. Joyce Thomas has found it necessary, owing to his military duties, to resign his membership of the Highways Committee of the London County Council.

Mr. W. F. Long has been appointed general manager at Cape Town of the Cape Electric Tramways, Limited. For nearly fourteen years Mr. Long has held the position of city electrical engineer at Cape Town.

Mr. E. Manville, of London and Coventry, president of the Associated British Motor Manufacturers, has consented to serve as a member of the Board of Referees in connection with the excess profits duty.

Mr. A. H. Preece, of Messrs. Preece, Cardew, Snell and Rider, of London, arrived at Shanghai in December, and has prepared a report advising the Municipal Council as to the extension of the electricity undertaking.

Professor J. H. Dobson, general manager of Johannesburg Municipal Tramways, and Electric and Gas Supply departments, has been elected President of the Union of South Africa Association of Municipal Electrical Engineers.

Mr. J. E. M. Stewart, who has resigned the post of chief assistant engineer in Leicester Corporation's electricity station, owing to ill-health, was referred to by Alderman Flint, at the Council's January meeting, as a most capable and loyal servant.

Mr. S. J. Clunas, station engineer at the electricity works of the Cape Town Municipality, has been appointed acting city electrical engineer owing to the appointment of Mr. Long, the electrical engineer, as general manager of Cape Town Tramways.

Mr. J. S. Brodie, borough engineer at Blackpool, is to succeed Mr. T. H. Wakelam, county engineer for Middlesbrough, as president of the Institution of Municipal and County Engineers. The annual meeting will be held at Blackpool in June next.

Mr. G. F. Craven, general manager and engineer, Reading Corporation Tramways, has been refused leave of absence to enable him to undertake immediate military service, but no objection was raised to his presenting himself for attestation in the Army Reserve.

Mr. R. A. Brown, chief assistant at Falkirk electricity works, has been appointed burgh electrical engineer to fill a vacancy caused by the resignation of Mr. H. Ranson, who has joined the forces. Mr. Brown was formerly with Glasgow Corporation Tramways.

Mr. A. E. McKenzie, chief assistant engineer, Manchester Electricity Department, has been recommended by the Electricity Committee for promotion to the post of deputy chief engineer, at a salary of £700 per annum, with annual increments of £50 until £800 is reached.

Alderman J. Hill, on January 21, was returned without opposition as Member of Parliament for the Central Division of Bradford, to fill the vacancy caused by the death of Sir George Scott Robertson. The new M.P. has taken a prominent part in the development of the city's tramways.

Second Lieutenant A. R. Courtenay, lately acting manager of the General Electric Company's publicity department, has for two months been serving in France with the Royal Naval Air Corps. He recently transferred to the A.S.C. and proceeded to the Mediterranean Expeditionary Force.

Mr. J. Terry, district traffic superintendent, southern section of the London County Council tramways department, who will attain the age of 65 years on March 2, 1916, is to be retained up to March 2, 1917. The Highways Committee made a recommendation to that effect at a meeting of the Council.

Sir William Middlebrook, M.P. for South Leeds, one of the New Year Knights, was on January 5 the subject of a congratulatory resolution from Leeds Corporation. The Lord Mayor mentioned, among other matters, the new knight's work as chairman of the Local Legislation Committee of the House of Commons.

Mr. W. M. Milnes, electrical engineer to Coventry Tramways and electricity undertakings, has been refused permission by the Tramways Committee to apply for a commission in the army. Mr. H. W. Wale, vice-chairman of the committee, has explained to the Corporation that Mr. Milnes could not be spared. Mr. T. R. Whitehead, the engineer and general manager, was prepared to take on the work, but the committee would not permit him, as he was already "doing the work of a man and a half."

Mr. C. N. Hefford, electrical engineer and manager, Leeds electricity department, has been voted an increase of salary from £600 to £800 per annum. Councillor Lupton, in proposing the increase, stated that Mr. Hefford's predecessor, Mr. Dickinson, was receiving £900 when his services were acquired by Liverpool at £1,000, which had since been increased to £1,500. A year ago Mr. Hefford carried out work for the extension which, if done by a consultant, would have entailed an outlay of 5 per cent., on, roughly, £120,000. While Leeds was sixth on the list of cities and towns in the United Kingdom in the output of current, and third in cheapness of cost, it was twentieth in respect of the salary of the engineer.

Mr. G. N. G. Tucker, of the "Electrician" Printing and Publishing Company, died on January 15, in his 64th year, after an illness extending over several months.

Mr. R. F. S. Venner died on January 24, after a long period of indifferent health. He was greatly esteemed, and was the son of Colonel Venner, of the Indian Army. Mr. Venner, who was one of the original pupils of Faraday House, was inventor of a number of electrical signs. He was the London agent for meters used in recording power consumption on tramcars.

WITH THE FORCES.

Lieut.-Colonel H. C. T. Hildyard, the Paris representative of the South-Eastern and Chatham Railway, who has been on active service throughout the war, has been awarded the Distinguished Service Order.

Sir John Courtis, chairman of Cardiff Tramways Committee, is a member of the Selection Board for Wales who adjudicate upon the fitness of men desirous of entering the Inns of Court Officers' Training Corps.

Regimental Sergeant-Major J. Gill, 23rd Battalion Rifle Brigade, prior to the war was on the traffic staff of Blackpool Corporation Tramways. On attaining his present rank he has been made the recipient of a sword from the non-coms. of the battalion.

Mr. F. W. Mozley, chief engineering assistant to Nelson Corporation, and eldest son of Mr. Henry Mozley, general manager of Burnley Corporation Tramways, has joined the newly-formed engineering company of the Artists' Rifles Officers' Training Corps.

Sergeant W. R. Smethurst, 2nd Battalion Royal Sussex Regiment, formerly a motorman with Salford Corporation Tramways, has been congratulated by the Tramways Committee on being awarded the D.C.M. The resolution is to be engrossed on vellum and presented to the sergeant.

Mr. J. E. Acfield, chief assistant in the office of Leeds city engineer, has received a commission in the Royal Engineers. At the outbreak of the war there were 39 men in the office eligible for enlistment. Twenty-five are now serving with the forces, nine have attested under the Derby scheme, and four have been rejected.

RAILWAY OFFICERS AND STAFF.

Sir Wm. J. Goulding, Bart., has been re-elected chairman of the Irish Railway Clearing House for 1916.

The Right Hon. Lord Joicey, deputy chairman, North Eastern Railway, has accepted the presidency of the Railway Benevolent Institution for 1916.

Sir Thomas Shaughnessy, on whom the King conferred the dignity of a barony on New Year's Day, has taken the title of Lord Shaughnessy of Montreal (Canada), and of Ashford in the County of Limerick, Ireland.

Mr. A. G. Reid has been presented with a silver rose bowl by the Irish Railway Managers' Conference, on the occasion of his retirement from the position of general manager of the Dublin and South-Eastern Railway.

The Right Hon. F. H. Jackson, a director of the Bank of England, has been elected to fill the vacancy on the Board of the London and South Western Railway Company caused by the resignation of the Earl of Selborne, K.G.

Mr. J. Richardson has been presented by the King with the Royal Victorian Medal in recognition of his having had charge of the royal trains on the London, Brighton, and South Coast Railway for forty years. Mr. Richardson has retired from the post of outdoor locomotive superintendent.

Great Eastern Presentations.—Mr. A. C. Hutcherson, on retiring from the position of goods manager for the Cambridge district, has been presented with a gold watch and chain by the chief officers of the company. Mr. H. W. Thornton, general manager, made the presentation, and Mr. W. C. May, chief traffic manager, spoke of the affection entertained for the retiring officer. Mr. S. White up to 1914 had organised 34 annual outings and dinners for the staff of the Liverpool Street offices. In recognition of this voluntary labour the staff have presented him with a cheque for £55 and an illuminated address, Mr. Thornton handing the gifts to the recipient.

G.E.R. Manager and British Trade.—Mr. W. H. Thornton, general manager of the Great Eastern Railway, has given his views on the question of British manufacturers taking steps to capture German trade. He fears that the movement may be weakened by the founding of several overlapping organisations, and he advocates a national affiliation of interests under the direction of some individual whose ability, energy, and past services justify his selection. That person must gather up all the threads of the movement, and act as a head recruiting sergeant in mobilising this country's efforts. Personally he is of opinion that the war is won, though there are still hard knocks and counter-knocks to be given.

Digitized by Google

TRAMWAY AND LIGHT RAILWAY NOTES.

BIRMINGHAM.

A New Line.—Trading Departments as Milch Cows.

Messrs. Dick, Kerr and Company, Limited, have completed the construction of an extension of the Birmingham Tramways, from Stratford Road to Shirley Road, Acocks Green, a distance of two miles one furlong. For the most part it consists of double track. The number of the route will be 44, and the city terminus will be either in Station Street or High Street, the full fare being 2½d. On account of the shortage of labour only a limited service will be run. Colonel Druitt, R.E., of the Board of Trade, inspected the new route on January 25, going over it with Councillor Harrison Barrow, chairman of the Tramways Committee, Mr. Alfred Baker, general manager, Mr. Humphries, Deputy City Surveyor, &c. The tramways, electric supply, and gas departments have discussed the amount of the sums that they expect to be able to hand over to the city when their financial year ends on March 31. Last year the tramways voted the sum of £30,000, as against £25,134 for the preceding year, but no announcement regarding this year's allocation is to be made until the Finance Committee have been communicated with. It is stated, however, that the tramways "have had an exceedingly good year, due largely to the increased fares charged during the greater part of the twelve months." In closing an announcement on the matter a local writer says:—"It remains now for the Finance Committee to consider whether they cannot persuade the trading departments to allocate to the relief of the rates a much larger sum from their profits than they appear at present disposed to do." Not a thought is given to the need of track renewals, now being carried out on some sections, or of the higher charges for road maintenance resulting from the use of forty-one motor omnibuses by the tramways department.

BLACKPOOL.

Season Tickets at £3 per Annum.

By 21 votes to 18, Blackpool Council have rejected a motion by Alderman Grime to raise the charge for season tickets to £5 per annum for the whole system, and to make the present £3 ticket available on single sections only. The general manager, Mr. C. Furness, had reported that since the charge of £3 was instituted the various sections had been extended; yet the ticket remained available for the whole of the system, causing a loss of £2,000 a year. He suggested a charge of £4 for a general contract and £3 for a sectional ticket, or else the abolition of contracts. Alderman Grime, in proposing his motion, asked who would have a motor car when they could go "joy riding" all over the tramways for £3 a year. It was only the 2d. ticket on the Promenade line and the patronage of visitors that made the tramways successful, but he doubted whether that assistance would provide the £70,000 required in the near future for relaying two of the sections. He preferred to take the advice of Mr. Furness, because the manager possessed the "business mind." Mr. Furness was too honest to be ruled by the "municipal mind." Upon the latter remark being greeted with laughter, the alderman asked how the undertaking would have provided thousands of pounds for the relief of the rates if the Council had listened to the people who wanted to reduce the promenade fare. The chief opponent of the motion may be said to have admitted the strength of the manager's case when he said that Mr. Furness was a "trained expert with nothing to do except to look after his department."

COVENTRY.

Portable Lamps for Conductors.

The Tramways Committee have ordered small portable electric lamps to be supplied to the conductors.

GATESHEAD.

Serious Mishap—Span Wires in Place of Central Standards.

On February 5, at 7.30 p.m., a single-deck single-truck car was on the up track on Bensham Hill, awaiting a down car on the loop. The latter car failing to move, the driver of the up car applied his brakes and walked towards the down car, whereupon his own vehicle began to run backwards. After going 200 yards, it left the line at a curve, and overturned. Four pedestrians were crushed to death. A passenger and a woman conductor sustained leg fractures. Gateshead Council have agreed to the Tramways Company substituting span wires suspended from standards on each side of the Durham Road from Shipcote to the Low Fell terminus, in place of the existing brackets. The application was granted on condition that the whole of the centre standards on the several tramway routes within Gateshead be removed.

GLASGOW.

Tramway Battalion Facing the Enemy.—A Year's Rates and Taxes.—Record Receipts.

A number of casualties have occurred in the 15th Battalion Highland Light Infantry, composed of Glasgow tramway employees, who are now in France. The battalion was enlisted by Mr. J. Dalrymple, the general manager. The fund collected on the cars to provide comforts has reached a total of £500. Some of the money has been expended in purchasing wool, out of which socks, mittens, etc., have been knitted by the wives and friends of the men and by female members of the tramways staff. For the past year Glasgow Tramways department paid £80,229 in local rates, and £40,967 as income tax. For the seven days ended at midnight on January 8, the tramway receipts were £24,236, a record for a week. For the preceding week the total was £22,774. The previous record was for the week ended September 18, with £23,117, while prior to that the record was made in the New Year week of 1913, when £23,078 was received. Compared with the corresponding week of last year, the new record shows an increase of over £3,000.

LIVERPOOL.

A Successful Year's Trading.

The tramways and electric supply departments combined are contributing even larger sums to the rates than was the case last year, when the tramways undertaking gave £100,000 and the electricity undertaking £25,000. The committee have recommended the granting of the sum of £100,000 from the tramways, and £50,000 from the electricity profits.

LONDON.

Conference to Avoid Waste.—Through Bookings.—Route Number Illumination.—Luminous Stop Indicators.

In order to avoid wasteful competition during the war, an offer was made by the London County Council in July last to participate in a conference with representatives of other London traffic undertakings. Discussions with that object were in progress at the end of January, according to a statement made to the County Council by the Chairman of the Highways Committee (Mr. G. H. Hume). Asked if an offer was made to bring the Council's tramways into the through bookings arrangements devised in connection with the pooling of the receipts of the London underground railways and the General Omnibus Company, Mr. Hume replied in the negative. He observed, however, that through tickets had for several years been issued by underground railway, and, alternatively, tramcar or omnibus, from Charing Cross and the central termini to Highgate, thence to places on the Metropolitan Electric Tramways. Mr Hume also imparted some news concerning other through bookings, which his committee provisionally agreed to some months ago. These bookings are (1) between points on the Harrow Road tramways, the London Electric Railway, and the Metropolitan Railway; (2) from the Council's southern tramways to Leicester Square station of the London Electric Railway, via Charing Cross station, and (3) from the southern tramways to Mansion House station of the District Railway, *via* Blackfriars station. The agreement has not been put in force pending the decision that may be arrived at in the conference already referred to. Improvement is being allowed in the lighting of the indicator boxes of tramcars, while the route numbers of crystal glass on the County Council's cars have been inset with red. On the West Ham cars the route numbers are shown on the dashlight. The number of "request" stopping places has been reduced on the Metropolitan Electric Tramways, and luminous paint has been applied to the standards to make the places more conspicuous at night.

SHEFFIELD.

Combined Power Station.—Traffic Records Surpassed every Week.—Conductor's Action.—War Collections.—Passes for the Blind.

Sheffield Corporation having applied for a Provisional Order to enable the Kelham Island Power Station to be transferred from the Tramways Committee to the Electric Supply Committee, a Local Government Board inquiry was held on January 21. The Lord Mayor (Councillor F. A. Warlow) stated that the scheme was now in operation, and there was no reason to regret the step. Mr. A. R. Fearnley, manager of the tramways department, in giving the inspector statistics of the tramway traffic, stated that although fewer cars were being run at certain times of the day, the number was largely increased at other times for the munition workers Owing to the increased number of munition workers, the system was making records every week. On January 19, for instance, the number of passengers carried was greater than on any previous week-day. The total number of passengers during the week ended January 10 was 2,613,362, as compared with 2,146,166 in the corresponding week of 1915. At Sheffield County Court, on January 7, His Honour Judge Benson delivered judgment in the action brought by an ex-conductor for one week's wages from the Corporation in lieu of a week's holiday. The Tramways Committee decided that where holidays could not be given in 1915 a week's pay would be given. In July, 1915, defendants gave plaintiff notice to leave their service on August 5, no payment being made for the lost week's holiday. The Judge observed that in the ordinary way a man should receive 52 weeks' wages for 51 weeks' work, whereas since his 1914 holiday plaintiff had received only 52 weeks' wages for the full 52 weeks' work. He gave judgment for the plaintiff. Leave to appeal was granted. Two weeks' collections in the cars "To keep the Belgiums alive" resulted in £251 being gathered in. The free passes to blind people have been renewed for a year to the number of 171.

Digitized by Google

CAUSE OF THE ASTON ACCIDENT.

The Board of Trade have issued Colonel Druitt's report on his inquiry into the overturning of a Birmingham tramcar at Aston on November 12, resulting in the deaths of three passengers and injuries to others. In the course of the report Colonel Druitt says :—" I think there can be no doubt that the brakes on the car were in perfect order at the time of the accident, and that what probably happened was that Motorman Owen, after leaving the stop at Park Road, let the car coast down the gradient, keeping it under control by means of the hand brake, and that when after passing Pugh Road and approaching the compulsory stop at the bottom of Victoria Road, he found he was going rather too quickly to make an easy stop, he suddenly applied the magnetic track brake to its full extent instead of gradually step by step, and so caused the wheels to pick up. This would perhaps account for the sudden jump the car gave between Pugh Road and the ' stop ' described by the conductor, W. Chadwick. If the speed was not greater than nine miles an hour, as stated by Motorman Owen, the car would, I think, have gone round the curve, which is of 150 ft. radius, with a super-elevation for the outer rail of about ¼ in., without being derailed if the wheels had been revolving freely, but if they had picked up owing to the sudden application of the magnetic track brake to its full power, they could not accommodate themselves to the curve, and so the right hand leading wheel hit the nose of the crossing between the two tracks, and the car became derailed and overturned."

The report also states that as the sand-pedal at the driver's end was found to be right home after the accident, it is possible he forgot to place it in the operating position when he changed ends on the car for the return journey.

DEVONPORT ARBITRATION AWARD.

Mr. B. Hall Blyth has issued his award in the arbitration between Plymouth Corporation and Devonport and District Tramway Company to determine the amount to be paid for the Company's undertaking, which had been acquired by agreement. The award directs that the Corporation shall pay the company £103,970 1s. 4d. in respect of :—

(1) The company's tramway undertaking.
(2) The light railway.
(3) The profits the company would have been expected to earn between October 2, 1915, and August 12, 1919.

Each party are to pay their own costs of the reference, and the arbitrator's expenses are to be borne in equal shares by the Corporation and the company.

The award was received by Plymouth Tramways Committee on January 24, when they decided to accept it. A vote of thanks was accorded to the sub-committee and the officials who had been concerned in the arbitration proceedings.

At the company's annual meeting on January 26, the chairman (Mr. C. S. Hilton) said that the amount of the award remained as a loan to the Council at 5 per cent. until that body raised the necessary funds to pay it off, but there was no obligation to do so until after the war.

THE B.E.A.M.A.

ANNUAL GENERAL MEETING.

The annual general meeting of the British Electrical and Allied Manufacturers' Association was held at the Connaught Rooms, Kingsway, London, on Thursday, January 20. Mr. F. R. Davenport (Willans and Robinson, Limited), chairman of the Council, presided. There was a good attendance of members.

In submitting the annual report and balance sheet, the Chairman said that notwithstanding the handicaps under which members were suffering due to shortage of labour, difficulties in obtaining materials, Government control, etc., they had, compared with some other trades, no reason to be dissatisfied with the situation. Public attention was at the present time being largely directed to the question of the probable situation after the war, and several associations purporting to look after that matter, and working more or less on parallel lines, had sprung up. The B.E.A.M.A. had been invited to join some of these associations, but up to the present had not done so, though they had given considerable time to the exchange of views and the holding of conferences, and were still directing their attention to the efforts made towards creating some central and representative body which would embrace the common interests of all British traders. Suggestions had been made by the B.E.A.M.A. to the Colonial Office that money raised within the Empire should be expended on British goods, and whilst the Secretary of State for the Colonies was unable to give any definite assurance, there appeared now to be a far more favourable atmosphere surrounding the whole question of colonial and allied trade. The Association had been in conference with the Advisory Committee of the Commercial Intelligence Department of the Board of Trade, to whom memoranda had been submitted, many of the recommendations put forward being, the Chairman understood, embodied in the report made by this committee. That looked as if things were tending in the right direction. They had been in conference with the Government Research Committee, which was appointed by the Board of Education to inquire into the broad question of scientific and industrial research and for the granting of sums of money in aid of research. Although he had nothing to say at the moment as to probable results, their committee was a strong one, and there was every sign that good results would flow from the effort. With a view to organising and extending the export work of members, additions had been made to the export staff, and Overseas Committees had been appointed in India, Australia, and South Africa. Others, it was hoped, would be shortly appointed. As the report told them, home conditions of contract and standardisation still remained amongst their fundamental activities, and they had been actively engaged in these directions.

In the discussion which followed, Mr. Lundberg (A. P. Lundberg and Sons), Mr. Longbottom (Electromotors, Limited), and Mr. Berry (Berry, Skinner and Company) referred to the unsatisfactory position in regard to patents. Practically all members were now controlled firms, and their patents were naturally in a state of suspension, although patent fees had to be paid. This meant that the useful life of the patent would be shortened by the duration of the war. It was considered that notwithstanding the unsympathetic attitude of the Board of Trade, the matter should be persevered with. The report was adopted, and Callender's Cable and Construction Company, Limited, were elected members of the Council.

The following firms have been elected members :—Ferguson, Pailin and Company, Openshaw; and Mirrlees, Bickerton and Day, Limited, Hazel Grove, near Stockport.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS FOR LETTERS PATENT.

Adams, A.C.—Side-splash mudguards for motor vehicles (249).
Adams, W. S.—Car trucks (144).
Archer, E. G.—Direction indicators for vehicles (1,031).
Berry, C.—Attachment for use with the starting handle of motor vehicles (161).
Boardman, W. H.—Tires for road vehicles (920).
Bouman, W. F. J. H.—Transmitting signals to railway vehicles (877).
Boys, C. V.—Motor wheel (843).
British Westinghouse Electric and Manufacturing Company.—Starting mechanism for automobiles (198).
Broscombe, H.—Control of measures of vacuum in connection with vacuum brakes (18,113).
Bullers, Ltd.—Supporting and insulating electric lines (1,309).
Cameron, A.—Trolley system of electric tramways (695).
Chadburn, W. and W. R.—Speed and direction indicators (21).
Churchill, J. R.—Tipping bodies for motor vehicles (418).
Craddock, T. F. (*Burn and Co. and another*)—Railway vehicles (935).
Crozier, A. A.—Resilient tire for wheels of motor cars (1,364).
Cucullu, R.—Apparatus for generally handling motor vehicles (258).
Daroowalla, E. B. and K. B.—Signalling for road vehicles (141).
Dixon, H. H.—Fastener for motor vehicle bonnets (1,359).
Dover, H. J.—Means for placing collectors in contact with electric conductors (1,116).
Duncan, R. A.—Control mechanism for preventing excessive speed of motor vehicles (226).
Elliott, J.—Permanent way (302).
Entz, J. B.—Power transmission mechanism, especially applicable to the propulsion of automobiles (18,138).
Eunson, J. W.—Machine for dressing rails (322).
Farnsworth, A. W.—Suspension of self-propelled vehicles (1,077).
Glennie, E. H.—Lifeguard for tramcars (18,158).
Goodwin, W. B.—Mounting vehicle body on chassis (1,275).
Goodwin, W. B.—Spring suspension device of motor vehicles (1,276).
Gray, B. P.—Pneumatic tires for motor vehicle wheels (847).
Hamilton, J. E.—Electric controller for use with electrically-propelled vehicles (70).
Howell, N. G.—Variable speed transmission gear (331).
James, C. A.—Motor vehicle wheels (18,170).
Lomax, F.—Tires for road vehicles (920).
Macfie, R. F.—Motor vehicles (85).
McConway and Torley Company—Car couplings (749).
Milford, F. F.—Motor vehicle wheels (18,170).
Mizen, A. S.—Guide for connecting trolley wheels to overhead wires (235).
Múrua, R.—Apparatus for handling motor vehicles (258).
Navarte, N.—Apparatus for handling motor vehicles (258).
Otermin, A.—Apparatus for handling motor vehicles (258).
Philipson, P. C., T. W. H., and W.—Variable speed driving gear (567).
Piggott, W. C.—Spare rims or wheels for motor vehicles (1,165).
Railway Signal Company—Apparatus for operating railway and tramway signals, points, etc. (229).
Rayner, E. S.—Railway sleepers and rail fasteners (651).

Digitized by Google

FOR HIGH-CLASS

CONDENSING PLANT

WRITE TO

THE MIRRLEES WATSON CO., LTD.,

SCOTLAND STREET, GLASGOW.

Ask us to quote you

As specialists in the manufacture of highest grade

Seamless Steel Tubes

we can offer you advantages in quality and price—and also promptly meet your every need. Hence, when you require tubes for any purpose, ask us to quote you.

Oriental Tube Co. Ltd., West Bromwich

Wires: "Tubes, West Bromwich."
Phone: 45 West Bromwich.

ORIENTAL

HALF-YEARLY VOLUMES

NOW READY.

Volume XXXVIII.—July-December, 1915.

THE TRAMWAY AND RAILWAY WORLD.

Fully Indexed. Handsomely and strongly bound.

Price, 10s. By post, 10s. 6d.

Address: THE TRAMWAY AND RAILWAY WORLD,
Amberley House, Norfolk Street, W.C

Telegrams: "Tramigro, London." *Telephone No.: Gerrard, 2948.*

Roberts, W. S.—Apparatus for operating signals, points, etc. (229).
Schattner, E.—Electric motor starters and controllers (661).
Shepherd, J.W. (*Studholme*)—Differential gear for motor vehicles (431)
Spencer, A.—Bogies for railway vehicles (12).
Sprague Safety Control and Signal Corporation.—Automatic air brake systems (18,213).
Stait-Gardner, F.—Trucks for railway or tramway vehicles (18,215).
Stewart, T.—Pneumatic wheel tires of motor cars (560).
Thomas, J. G. P., and Thomas Transmission, Limited—Power transmission on road or rail trains, etc. (241 and 1,229).
Thomas, S.—Trucks for railway or tramway vehicles (18,215).
Travis, T. G.—Electric motor starters and controllers (661).
Udale, W. S. J., and S. M.—Brake mechanism for trailers (18,192).
Vacuum Brake Company—Means for placing collectors in contact with electric conductors (1,116).
Walker, W. P.—Means for placing collectors in contact with electric conductors (1,116).
Walton, J. R.—Electric motor starters and controllers (661).
Westinghouse Brake Company—Fluid-pressure braking apparatus (588 and 589).
Woods-Gilbert Rail Planer Co.—Machines for dressing rails (322).
Woosnam, A. (*Ambrosini*).—Trailer vehicles (183).
Yanagidate, S.—Fenders for motor cars (476).
Yoxall, J.—Bearing for motor car back axles (719).

Specifications Published.

1914.

Alcock—Means for actuating brakes on moving vehicles from controlling apparatus on the permanent way (23,915).
Dallison—Variable-speed driving mechanism for motor vehicles (22,968)
Irving—Apparatus for controlling railway trains in motion (24,048).
Kerr—Train control apparatus (24,657).
Meyer—Trolley poles or bows for electrical vehicles (24,074).

1915.

Adams—Mudguards for motor vehicles (3,709).
Bell and Jones—Motor road vehicles (4,799).
Betts—Chairs or chair plates for rails and guard rails (16,320).
Betts—Chair plates for railway rails and guard rails (16,321).
Blanke—Signalling devices for vehicles (1,601).
Collet—Machines for grooving and boring railway sleepers (6,099).
Feroci—Automatic railway car and compressed air or steam pipe coupling device (6,158).
Fisher and Ralph—Permanent way (6,690).
Fowler, Livsey and Walker—Portable track wheels for vehicles (665).
Freakley and Aynsley—Resilient tires for road vehicles (6,255).
Humber, Limited, and Burgess—Axle torque members for use on motor vehicles (5,916).
Mosier—Car doors (9,439).
Turner and Donovan—Fluid-pressure braking apparatus (8,378).
Walker—Electric signalling apparatus (3,774).
Walter and Lee—Lifeguards for motor vehicles (1,828).
Whitehead—Tires for motor vehicle wheels (9,263).
Wigley—Automatic danger signal train stopper (9,811).
Wuillot—Combined electrical lighting and starting systems for motor vehicles (190).

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.		1915. WEEKS ENDED.					1916. WEEKS ENDED.					AGGREGATE.		
		Jan. 2.	Jan. 9.	Jan. 16.	Jan. 23.	Jan. 30.	Jan. 1.	Jan. 8.	Jan. 15.	Jan. 22.	Jan. 29.	Wks.	1916.	Increase or Decrease.
		£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine		60,549	52,720	51,491	49,823	48,728	58,098	50,841	50,239	47,515	47,476	4	196,071	– 6,691
Auckland		...	...	...	...	...	...	...	...	...	...	...	...	...
Burma	Rs.	3,051	3,537	3,435	3,446	3,686	3,222	3,613	3,743	3,475	3,327	...	92,343	+ 6,804
Calcutta	Rs.	60,748	75,317	67,513	61,092	62,912	66,731	80,501	70,455	68,070	65,343	4	284,369	+ 17,535
Hong Kong	$	...	...	...	...	...	...	...	...	...	...	...	...	...
Madras	Rs.	...	(2 weeks)	28,435	(2 weeks)	28,951	...	(2 weeks)	34,257	(2 weeks)	32,126	4	66,383	+ 8,997

Companies Issuing Monthly Statements.

	1914.					1915	1915.					1916	Wks.	AGGREGATE.	
	August.	Sept.	October.	Nov.	December	Jan.	August.	Sept.	October.	Nov.	December	Jan		1915-16.	+ or –.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Brazilian Street Mlrs.	...	...	...	...	...	...	...	...	...	...	...	...	...	—	—
BrazilianTraction Mlrs	6,166,100	6,096,940	6241170	5929730	6,010,490	...	6,576,000	6,494,000	6793000	6336000	6,527,000	...	52	77,113,110	+3,761,632
Brisbane	33,172	28,031	28,763	28,600	30,890	...	35,064	30,360	31,880	31,120	33,960	...	52	372,034	+ 23,923
British Columbia $	674,812	650,516	661,000	648,485	...	...	507,126	517,022	538,826	562,782	...	...	22	2,636,479	– 688,357
Buenos Aires Pt. & C.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze	40,508	40,333	42,341	42,256	44,000	...	41,468	39,355	42,516	42,603	43,528	...	26	250,930	– 1,836
Cape Town	...	...	...	...	...	...	...	13,310	...	13,870	16,589	...	—	—	—
Carthagena& Herrerias	2,758	2,175	1,543	1,379	1,255	904	1,523	1,252	2,169	2,090	2,129	2,841	4	2,841	+ 1,937
Cordoba	13,371	12,384	12,904	12,468	12,091	...	14,157	13,213	13,433	13,785	13,025	...	34	124,148	+ 4,718
East India	2,112	1,980	2,007	2,029	1,839	1,914	2,266	2,054	2,069	2,065	2,062	2,015	26	12,531	+ 650
Kalgoorlie	3,042	2,864	2,525	2,414	...	...	3,165	2,997	2,675	2,611	...	...	48	30,402	+ 1,483
La Plata	4,060	3,598	4,540	4,540	4,452	4,540	4,165	3,894	4,405	4,545	4,564	4,533	4	4,533	– 7
Lima	29,898	28,717	30,646	29,712	...	...	32,011	30,543	32,208	30,703	...	...	48	351,169	– 9,612
Manila ... ... $	128,500	116,300	125,750	129,000	132,500	...	126,650	123,946	124,131	129,447	141,350	...	52	1,495,534	– 108,031
Melbourne	...	..	...	...	...	...	...	61,211	...	...	...	...	—	—	—
Mexico ... ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Montevideo	26,075	25,226	26,500	27,081	28,605	32,459	26,493	25,070	27,167	28,407	31,305	34,252	13	93,964	+ 5,818
Port Elizabeth ...	...	...	...	...	...	...	...	2,927	...	3,110	4,360	...	—	—	—
Puebla ... ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Rangoon	4,629	4,119	4,600	4,405	4,459	4,689	4,510	4,445	4,886	5,028	4,492	4,763	4	4,763	+ 74
Toronto ... ... $	850,639	879,321	849,636	824,634	...	...	762,627	804,902	792,001	851,113	...	...	48	8,793,719	– 502,658
Winnipeg ... $	322,762	310,996	330,562	330,398	...	...	251,189	261,982	286,146	323,025	...	...	48	3,122,620	– 610,281

(*Continued on page 142*)

Digitized by Google

TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED.					1916. WEEKS ENDED.					AGGREGATE.		
	Jan. 2	Jan. 9	Jan. 16	Jan. 23	Jan. 30	Jan. 1	Jan. 8	Jan. 15	Jan. 22	Jan. 29	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	1,588	1,947	1,560	1,500	1,485	1,902	2,152	1,804	1,677	1,662	34	61,940	+ 40,133
Accrington Corporation	555	515	480	478	447	617	...	...	...	...	—	—	—
Ayr Corporation	248	233	215	211	208	269	305	244	257	256	37	14,120	+ 930
Bath Electric	*	...	...	...	...	...	...	...	...	...	—	—	—
Birkenhead Corporation	1,263	1,232	1,218	1,187	1,137	1,432	1,457	1,408	1,414	1,407	43½	60,322	+ 5,363
Birmingham Corporation	12,931	12,399	12,189	12,173	11,970	15,986	15,999	15,564	15,707	15,616	44	629,379	+ 95,660
Blackburn Corporation	1,281	1,219	981	1,012	1,013	1,232	1,199	1,116	1,076	1,093	43⅝	55,286	- 45
Blackpool and Fleetwood	431	290	259	266	263	414	380	312	291	294	4	1,356	+ 111
Blackpool Corporation	831	734	611	571	546	891	957	785	697	673	44	72,098	- 2,379
Bolton Corporation	3,170	2,568	2,482	2,385	2,438	3,040	3,050	2,600	2,665	2,617	44	117,960	— 615
Bournemouth Corporation ...	1,859	1,701	1,708	1,614	1,609	1,998	1,997	1,880	1,910	1,876	44	93,417	+ 5,046
Bradford Corporation	6,125	5,837	6,021	5,680	5,554	5,982	6,244	6,184	6,345	6,261	43	282,274	+ 11,964
Brighton Corporation	881	887	842	778	744	990	940	874	896	913	43¼	48,523	+ 859
Bristol	10,125	8,832	8,382	7,587	7,789	13,134	9,515	9,589	9,384	9,366	4	37,855	+ 3,905
Burnley Corporation	1,483	1,519	1,419	1,406	1,376	1,779	1,699	1,689	1,569	1,608	44	70,395	+ 2,540
Burton-on-Trent Corporation ...	311	294	281	258	259	365	316	282	286	264	44	12,525	- 296
Bury Corporation	1,275	1,172	1,170	1,142	1,109	1,368	1,354	1,274	1,278	1,267	44¼	59,066	+ 382
Cardiff Corporation	2,722	2,533	2,486	2,393	2,304	2,909	2,806	2,732	2,737	2,715	43	118,034	- 1,004
Chatham and District	969	970	969	945	859	1,301	919	1,038	1,075	1,136	4	4,169	+ 425
Chesterfield Corporation	260	251	248	243	234	316	271	261	262	272	43	11,712	+ 111
Colne Corporation...	219	220	...	...	...	266	246	...	...	...	—	—	—
Cork Electric	414	459	427	422	407	568	414	470	462	446	4	1,792	+ 78
Croydon Corporation	1,661	1,670	1,588	1,431	...	1,761	1,778	1,674	1,665	...	42	77,738	+ 4,966
Derby Corporation	1,060	961	914	901	..	1,244	1,098	1,021	1,060	...	—	—	—
Dover Corporation	260	249	247	235	226	298	266	263	259	275	43	13,479	+ 2,286
Dublin and Lucan	283	136	109	111	107	276	114	113	112	118	4	458	- 5
Dublin United	6,017	5,821	5,695	5,506	5,188	6,324	6,171	6,041	6,018	5,919	4	24,149	+ 1,840
Dundee City	1,265	1,558	1,207	1,178	1,158	1,399	1,704	1,293	1,304	1,281	36¼	50,105	+ 2,891
East Ham Corporation	1,176	1,298	1,245	1,204	1,115	1,309	1,349	1,303	1,294	1,271	43⅝	56,846	+ 5,882
Exeter Corporation	378	341	317	295	272	324	360	335	338	325	43	16,330	+ 925
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	21,857	21,095	19,688	19,969	19,606	22,784	24,252	21,755	21,744	22,297	4	759,192	+ 54,410
Glasgow Subway	954	1,115	1,066	1,103	1,089	1,027	1,290	1,211	1,219	1,257	4	5,167	+ 595
Glossop (Urban Elec. Supply Co.)..	112	108	109	103	101	144	134	131	132	132	5	675	+ 141
Halifax Corporation	2,383	2,025	1,925	1,930	1,884	2,181	1,959	2,066	1,961	1,959	42⅝	95,227	+ 887
Hastings and District	956	715	778	701	598	1,064	825	773	701	756	4	3,055	+ 263
Huddersfield Corporation	2,474	2,343	2,311	2,337	2,179	2,642	2,642	2,561	2,620	2,666	43	116,372	+ 15,828
Hull Corporation	3,267	3,120	3,074	2,961	2,947	3,421	3,322	3,269	3,219	3,191	43	134,746	— 1,247
Ilford U.D. Council	695	602	577	532	539	677	661	635	629	614	43	28,228	+ 3,210
Ilkeston Corporation	108	111	111	106	109	129	130	129	129	147	44	5,936	+ 332
Ipswich Corporation	434	391	382	367	237	548	501	473	482	474	42	23,747	+ 4,039
Isle of Thanet	289	282	275	237	216	292	268	256	241	254	17	4,471	- 943
Kilmarnock Corporation	204	167	143	142	140	197	199	158	157	160	37	6,261	+ 246
Lanarkshire	1,826	2,360	1,668	1,714	1,659	2,973	2,448	2,068	2,076	2,049	4	8,641	+ 1,240
Lancashire United	1,661	1,772	1,440	1,491	1,445	1,805	1,833	1,593	1,596	1,633	4	6,199	+ 452
Leeds City	8,491	8,038	8,186	7,925	7,710	9,515	9,119	8,893	8,875	9,035	44	391,404	+ 31,227
Leicester Corporation	3,146	2,911	2,824	2,776	2,765	3,651	3,279	3,173	3,234	3,197	4	13,520	+ 1,838
Leith Corporation...	723	697	641	627	633	821	850	759	752	774	37	28,603	+ 2,212
Leyton U. D. Council	1,454	1,232	1,499	1,519	1,328	1,589	1,539	1,516	1,506	1,471	43	69,610	+ 9,389
Liverpool Corporation	12,936	12,849	12,411	12,384	11,896	13,896	14,240	13,672	13,744	13,375	4¼	57,183	+ 5,276
Llandudno and Colwyn Bay ...	199	175	167	168	162	189	178	187	195	198	8½	1,575	+ 116
London County Council	*	...	...	...	...	...	...	...	...	...	—	—	—
London General Omnibus... ...	*	...	...	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	178	159	170	143	138	154	137	127	129	125	16½	2,245	- 749
Maidstone Corporation	173	180	160	154	139	219	214	195	177	181	43	9,432	+ 433
Manchester Corporation	17,161	16,759	16,580	16,547	16,015	17,447	18,334	17,579	17,900	17,745	43	778,294	+ 28,221
Metropolitan Electric Tramways ...	*	...	...	...	..	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	..	...	...	...	...	...	—	—	—
Nelson Corporation	152	160	155	145	159	223	191	182	201	202	43½	8,526	+ 524
Newcastle-on-Tyne Corporation ...	5,977	5,920	5,719	5,584	...	5,424	5,930	5,823	5,868	...	—	—	—
Newport (Mon.) Corporation ...	803	769	754	707	693	967	898	862	876	845	44	36,883	+ 1,452
New St. Helens and District ...	954	883	784	809	786	1,097	992	919	911	906	30	31,074	+ 3,213
Northampton Corporation... ...	659	582	564	541	531	686	716	681	701	695	43⅞	31,510	+ 5,520
Nottingham Corporation	2,962	3,371	3,313	3,296	3,230	3,745	3,713	3,747	3,735	3,740	43	161,618	+ 12,569
Oldham Corporation	2,068	1,930	2,070	1,985	1,937	2,282	2,343	2,290	2,309	2,318	45	102,252	+ 5,191
Portsmouth Corporation	2,155	2,243	2,159	1,993	1,997	2,285	2,339	2,239	2,175	2,133	44	108,120	—
Preston Corporation	834	817	897	884	822	1,023	1,052	1,050	1,004	1,000	43	42,173	+ 2,336
Provincial...	1,974	1,909	1,932	1,813	1,791	2,257	2,167	2,144	2,066	2,061	17½	35,819	+ 2,713
Reading Corporation	679	736	700	618	623	873	750	783	769	751	43¼	34,388	+ 3,747
Rhondda Tramways	1,611	955	1,090	1,110	1,078	1,623	1,002	1,183	1,198	1,222	4	4,606	+ 372
Rochdale Corporation	1,539	1,499	1,491	1,443	1,403	1,747	1,703	1,615	1,659	1,700	41¼	74,295	+ 3,881
Rotherham Corporation	1,003	923	942	914	925	1,298	1,259	1,272	1,258	1,224	44	52,190	+ 7,039
Salford Corporation	5,041	4,640	4,741	4,583	4,479	5,287	5,241	5,154	5,222	5,181	43⅝	227,872	+ 10,476
Sheffield Corporation	8,398	7,965	7,917	7,767	7,803	9,446	9,737	9,667	9,687	9,712	44½	402,497	+ 56,423
Southampton Corporation... ...	1,180	1,285	1,214	1,187	1,167	1,483	1,527	1,508	1,441	1,459	43	65,070	+ 7,667
Southend-on-Sea Corporation ...	601	610	606	616	551	651	608	607	591	601	43	35,037	- 7,933
South Metropolitan Tramways ...	*	...	...	...	...	...	...	...	...	...	—	—	—
South Shields Corporation ...	772	727	657	659	638	799	804	740	732	756	43⅝	34,623	+ 1,620
Sunderland Corporation	1,539	1,304	1,282	1,302	1,245	1,697	1,610	1,481	1,470	1,525	44	66,123	+ 1,850
Sunderland District	633	585	481	484	526	683	694	569	543	603	13	7,398	+ 655
Swindon Corporation	207	172	168	162	...	251	204	187	184	...	—	—	—
Torquay Tramways	545	386	403	377	360	553	394	457	408	434	4	1,695	+ 167
Tramways (M.E.T.) Omnibus Co. ...	*	...	...	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	567	435	492	493	485	545	366	498	498	509	4	1,871	— 34
Wallasey Corporation	1,109	1,113	1,059	1,031	988	1,238	1,230	1,088	1,163	1,132	43⅝	55,579	+ 1,290
Walsall Corporation	749	651	697	654	637	997	804	824	815	834	5	3,434	+ 572
Walthamstow U.D. Council ...	767	723	720	681	684	854	789	752	774	782	44	38,823	+ 3,726
Warrington Corporation	410	439	423	421	...	513	511	492	486	...	—	—	—
West Ham Corporation	2,641	2,840	2,841	2,760	2,482	3,070	3,028	2,989	2,987	3,009	43¼	133,918	+ 11,612
Wigan Corporation	1,397	1,387	1,384	1,401	434	1,720	1,693	1,572	1,485	1,296	43	65,670	+ 2,542
Wolverhampton Corporation ..	1,061	1,032	1,025	962	1,002	1,217	1,152	1,142	1,149	1,097	44	49,754	+ 3,162
Yorkshire (West Riding)	1,505	1,409	1,434	1,353	1,337	1,799	1,697	1,521	1,595	1,641	5	8,254	+ 1,216

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates :

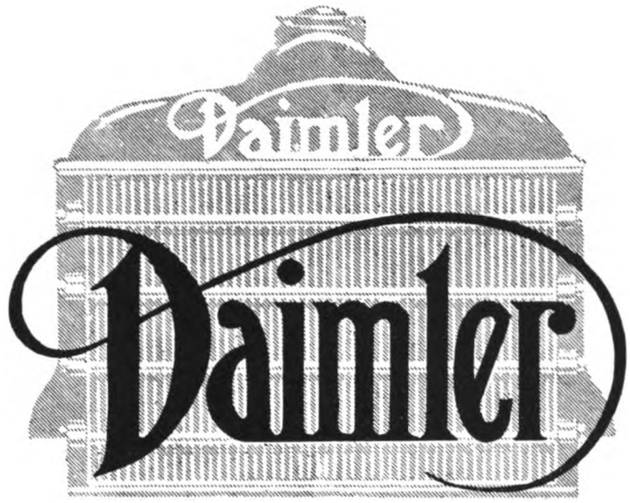
For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers).

For Places Abroad—
Thirty Shillings per annum.

Tel. No.: 2948 Gerrard.
Telegraphic Address: "Tramigro," London.

Amberley House,
Norfolk St., W.C.

Digitized by Google



COMMERCIAL VEHICLES

THE choice of a Daimler by the largest users of Motor Lorries is based upon experience and proven facts of its efficiency and economy. Their records prove that the maintenance costs are the lowest known. This is the prime consideration. The following Corporations and Firms have secured recent deliveries

BIRMINGHAM Corporation.
MANCHESTER Corporation.
SHEFFIELD Corporation.
Lanarkshire Tramways Co.
East Surrey Traction Co., Ltd.
Whitehaven Colliery Co., Ltd.
Greenfield Mill Co., Ltd.
Joshua Hoyle & Sons, Ltd., Manchester.
Coventry Metal & Iron Co., Ltd.
Joseph Evans & Co., Ltd., Birmingham.
CHESTERFIELD Corporation.
ROTHERHAM Corporation.
WALSALL Corporation.
Mansfield & District Tramways.
United Automobile Services, Ltd., Lowestoft.
John Croysdale & Sons, Ltd.
Alfred Hickman, Ltd., Bilston.
Galloways, Ltd., Manchester.
Ewarts, Ltd., Dudley.
Christopher Collins, Ltd., Birmingham

To secure quick delivery time is saved by stating, when enquiring, exactly the work on which the vehicle will be used, for every application must be sanctioned by the War Office before delivery can be given.

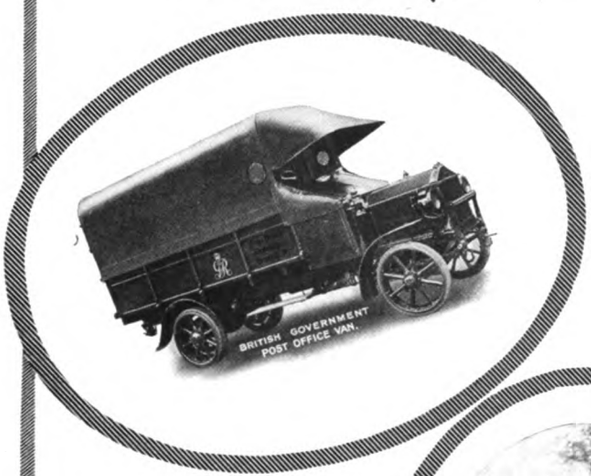
The Daimler Company, Ltd.

COVENTRY

LONDON: 27-28 Pall Mall.
BIRMINGHAM: Daimler House, Paradise Street.
MANCHESTER: 60, Deansgate.
NOTTINGHAM: 98, Derby Rd.
CARDIFF: Park Street.
LEEDS: Harrison St., Briggate.
NEWCASTLE: St. Mary's Place.
BRISTOL: 61, Victoria Street.

Digitized by Google

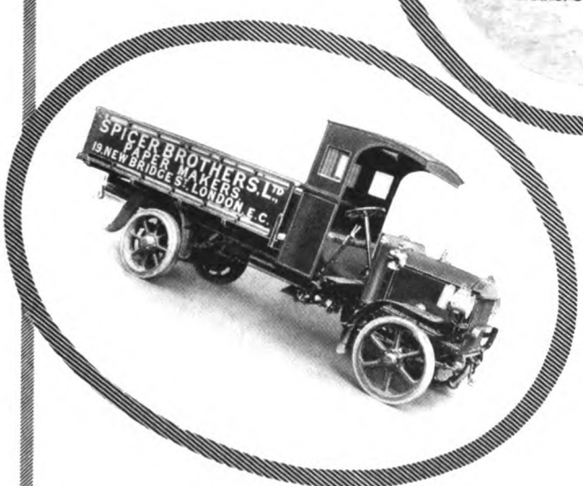
A FEW TYPES OF NAPIER BUSINESS VEHICLES

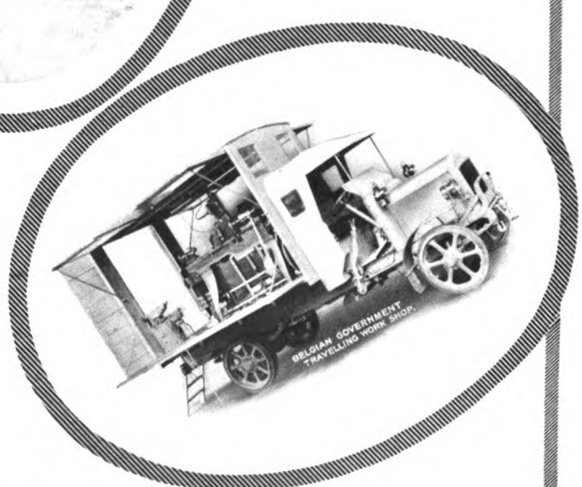


TO CARRY 30-45 CWT.

TO CARRY 3½ TONS.

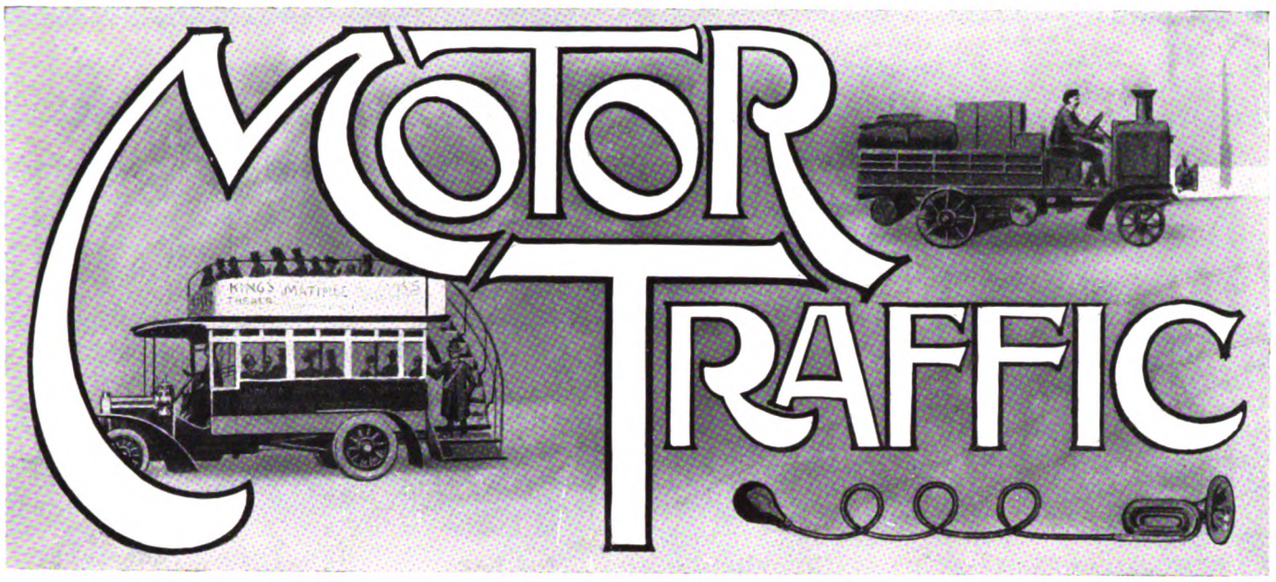
ENTIRELY BRITISH.





D·NAPIER & SON, LTD
14, NEW BURLINGTON ST., LONDON, W.
WORKS: ACTON, LONDON W.

Digitized by Google



The need of a Traffic Board for London, which has so long been urged, is now emphasised as never before. In times of peace it is disheartening to see transport systems engaged in wasting the money of the ratepayers and of private investors, but at a period when the existence of the Empire depends upon the conservation of its wealth, the continuance of competition is deplorable. Yet an interval of seven months has elapsed before the various undertakings have reached a frame of mind in which they are inclined to consider a proposal to prevent the waste of facilities. No doubt the dominant factor in bringing about the change of attitude is to be found in the impending departure of a number of their employees for Army service. For months, too, one of the greatest arsenals in the country has been crying out for additional means of conveyance for its workmen. Yet empty omnibuses are to be seen on various routes that should have been diverted to the service of the national needs. Beyond the confines of the Metropolis are several small towns whose population furnishes workers both for the arsenal referred to and for a number of large firms engaged on munition work. It was left to the tramway authorities of the aforesaid towns to decide to obtain powers for running omnibuses before the omnibus companies came forward with offers to meet the needs of the community. In these cases the local authorities hold the whip hand. Insignificant as they are in comparison with any of the twenty-nine London boroughs, they possess the power of withholding licences from any company as long as they themselves supply the needs of the locality.

* * * * * *

The remedy for London's traffic muddle is to be found in an extension of the policy that has led to the pooling arrangement just carried into effect among the railway and omnibus members of the Traffic Group. This has been accomplished under the Act obtained last session ; it is not a war expedient, as reported in daily newspapers. While not looking for such a Utopian result as the pooling of the traffic receipts of a public authority with those of private companies, we contend that the people of London are entitled to demand the greatest possible efficiency in their locomotion facilities. That demand can only be satisfied by a continuance of the policy that a few years ago led to inter-running on the northern tramways, and to a willingness to concede a similar advantage south of the Thames right away down to the distant suburbs served by a company undertaking. Equally important to the inter-running concession was the institution of through bookings on an underground railway, a company tramway, and the County Council's tramways. More encouraging still is the news that when the result of the forthcoming conference on facilities is announced, confirmation will be made of the statement published in our columns some months ago, viz., that arrangements have been made for the issue of through tickets between the tramways and the railways at Blackfriars and Charing Cross. If matters concerning exchange of traffic are making such progress, the question may be asked why worry about the Traffic Board recommendation of the Royal Commission and of the Parliamentary Committee of 1912 ? The answer is that matters that should be dealt with from the sole point of view of the public good are made the sport of political factions, and that four years ago the County Council were turned by a newspaper outcry from considering the question of a working agreement. Then also there are the questions of public safety and of road maintenance to be dealt with. In London the latter subject, as far as the omnibuses are concerned, will need separate treatment, for during the war the omnibuses and their drivers are at the call of the military authorities for the conveyance of troops in the case of an emergency, in addition to which they have been used for the transport of refugees and aliens. For military as well as civil reasons omnibuses are as necessary as tramways, and it would be a wise action of the Coalition Government were they at once to create the Traffic Board, making it representative of the several interests involved, with instructions to devise a scheme of working that will do justice to the ratepayers and to the shareholders of the several companies.

The general principles underlying the scheme for the employment of disabled soldiers and sailors that has recently been the subject of discussion at the Royal Automobile Club should commend themselves to every motor owner and user. At the meeting called by the Club of representatives of all the organisations connected with the motor movement to discuss this great question, it was possible to view the problem only in part. Any comprehensive project to deal with the matter as a whole must emanate from our Government acting in conjunction with the Governments of the Oversea Dominions. There are, however, about

Digitized by Google

MOTOR TRAFFIC.

all official schemes certain disadvantages. Necessarily such plans are rather of the cast-iron type, both in their framing and in their application. Such complete precautions have to be taken to safeguard their operation against captious criticism that any special consideration of the individual merits of each case is rendered impracticable from the start. Moreover, any such huge scheme must lack the personal touch, and the feeling of any close tie between those who seek assistance and those who offer it. It is quite possible that the main scheme would work best if there existed in affiliation to it a number of sectional schemes each covering a defined area. It is evidently with some such idea as this in mind that the meetings at the Royal Automobile Club have been called. The motoring community, as such, is only concerned with men who have earned their living in some capacity closely connected with the manufacture or use of motors. It would be extremely unwise to elaborate any scheme for the wholesale training as motor drivers of men incapacitated from other occupations. Anything of the kind would be bound, in the long run, to upset the labour market, and to cause ill-feeling and possibly acute labour troubles. The most that could be attempted is something in the nature of a re-shuffling process limited to the motor movement itself. Thus, there are doubtless men who, prior to the war, earned their living as motor drivers, or who during the war have done military or naval work in a similar capacity, but who now are for one reason or another incapacitated from continuing to earn their living as drivers. Physical injury is not the only possible cause of such disability, which might be brought about by rheumatism due to exposure and unfitting a man for rough open-air life, or by eye or nerve strain caused by much night driving over broken roads. On the other hand, there must be men who have hitherto earned their living as mechanicians or in other indoor employment connected with motor manufacture or operation, but whose health has been so far affected by military service as to render them unfitted for anything but an open-air life.

* * * * * *

The first step is apparently to get into touch from now onwards with all the men who come under either category, and at the same time to provide some central point upon which can be focussed offers from those who are willing to take such men and either to employ them straight away, or to train them without charge but with a view to subsequent employment. Doubtless, opportunities for affording some help, compatible with the sound conduct of their own business, will occur to many of our readers. In that case we take it that any suggestions or offers should in the first place be addressed to the Secretary of the Royal Automobile Club. At present the scheme is hardly more than in embryo, but there appears to be no reason to doubt that with the general approval of the various motoring organisations, it will rapidly develop into something practical and really useful.

———

The future as regards the available supply of motor vehicles is again very clouded. At present, while the private motor car of foreign origin is required to pay an import duty—and the same applies to its components and to accessories generally—nothing has been done to hinder the import and sale of tires and of industrial motor vehicles. It may be possible to draw a rough line classifying private motor cars as luxuries, and industrial vehicles and tires as necessities, but this definition is neither clear nor by any means accurate. Thus, cars for the private use of officials while engaged in their business may be far more in the nature of necessities than vans to be used for the delivery of luxuries, or chars-a-bancs to be employed solely for pleasure trips. It is rather curious that when an endeavour was made to set up an arbitrary distinction of this kind, no attempt was made to apply the same kind of reasoning to tires, separating the solid from the pneumatic. At the present moment, the question of the limitation of imports is being dealt with by a different authority and from a different point of view. The professed objects of the Chancellor of the Exchequer were primarily to level up the rate of exchange, and to prevent people from wasting money upon luxuries. The professed objects of the Board of Trade are, on the other hand, to free tonnage for the ocean transport of absolute necessities. In this connection, the stock in hand in this country available for sale is being taken into account, and, all the circumstances considered, it is well within the bounds of possibility that the motor vehicles will come in for a little attention before very long. To prohibit imports of motor cars would, of course, be to negative the utility of the import duties as a means of raising revenue. Moreover, unless we are mistaken, concessionaires of many of the leading foreign makes of industrial motors have very adequate stocks in hand, so that for the time being at least the export of gold in return for motors would not be stopped entirely. However, if anything at all is to be done in the way of prohibiting unnecessary imports, it is questionable whether there remains any justification for continuing unchecked the free import of foreign motor vehicles of any type. Probably, real necessities can be met by British machines and by the stock of foreign machines already in the country. The process of freeing a portion of the output of our own manufacturers serves incidentally to build up at home a big reserve of lorries of the approved military type, which would be available to the War Department in case of urgent necessity.

* * * * * *

It is impossible as yet to say whether any steps will be taken to prevent further imports of foreign motor vehicles; but all the circumstances taken together appear to point in that direction, and to be steadily increasing in aggregate weight. The consequences of any prohibition would be felt mainly by American firms, and by intending users in this country whose requirements do not in fact represent important necessities. From the point of view of British manufacturers, such a prohibition would not be timed so as to have the maximum effect in securing the future of the home industry. This effect would be produced by a prohibition, not applied at the present moment, but enforced for a reasonably long period following upon the cessation of hostilities, this period corresponding to the time during which the efforts of British manufacturers will have to be concentrated upon the difficult work of re-establishing themselves in the markets from which they have been excluded while their output has been earmarked by the Government.

Digitized by Google

MOTOR TRAFFIC.

Attention was recently directed to the fact that hundreds of motor wagons were parked in the streets, while munition workers complained of inadequate means of conveyance. Subsequently steps were taken to organise a detachment of the mechanical transport corps for the purpose of assisting manufacturers engaged upon Government work. Presumably this concession is not applicable to the London area only, as a similar arrangement has since been made at Glasgow, where great delays have occurred on the railways and at the docks. The need is as great elsewhere, notably in the cotton manufacturing district. For many months the dock and railway congestion at Liverpool has prevented manufacturers obtaining adequate delivery of raw material, and they have taken steps to form a company for the running of a fleet of ninety motor vehicles with Manchester as headquarters. The inadequacy of the railway facilities has on more than one occasion led the Liverpool and other tramway authorities to consider a scheme of transporting goods by tramway to Manchester and the intervening towns, but the opposition of the railway companies prevented the scheme from attaining fruition.

NORTH-EAST KENT OMNIBUS SCHEME.

MR. J. M. MCELROY'S ADVICE.—OFFERS BY OMNIBUS COMPANIES.

At a meeting of Erith Urban Council on January 24, the Clerk reported that the Tramways and Electricity Committee had held a conference with representatives of Bexley Council and with Mr. J. M. McElroy, general manager, Manchester Corporation Tramways, who was advising the Minister of Munitions on the question of traffic facilities for Government workers in the district. As a result it had been provisionally agreed that the Erith Council should allow the Bexley Council to run motor omnibuses within the Erith Urban District, subject to the latter Council's consent being first obtained, in consideration of the Bexley Urban District Council, allowing the Erith Council to run motor omnibuses within their area.

The foregoing arrangement was confirmed by the Council, who also decided to apply for a Provisional Order to enable them to run omnibuses in the urban districts of Bexley and Dartford, the rural district of Dartford, and the borough of Woolwich, with the consent of the respective Councils. An amendment of Erith Tramways Act, 1903, is also to be sought to enable the Council to enter into working agreements with local authorities who possess omnibus or tramway powers.

Woolwich Council, on January 26, received a report from the Works Committee urging that Erith Council should be informed that Woolwich would object to the issue of the Provisional Order unless Erith are prepared to make a contribution towards the cost of permanently paving the roads proposed to be used in Woolwich. At present the roads are formed of water-bound macadam, tar sprayed. The Council resolved to agree to the Order being granted, subject to the insertion of a clause that the omnibus service should not be started except with the consent of the Corporation.

The London General Omnibus Company have made an offer to Erith Council to provide facilities in the district, and an offer has also been received from Thos. Tilling, Limited, who already run to Woolwich. The Council appointed a deputation to meet the managers of the companies. Messrs. Tilling have also offered omnibus facilities to the Crayford district, and to discuss the matter with Crayford Parish Council. The latter have referred the matter to Dartford Rural Council.

ILLEGAL LOADING OF VEHICLES.

The Highways Committee of Surrey County Council have reported that good results have been obtained from the provision of a weighbridge at Spa Bottom, Esher, and stated that the county surveyor had been instructed to provide an additional pit upon a site to be approved. Alderman Pain, chairman of the committee, mentioned that £191 had been recovered in fines, which money went to the county. That was not the only good effect, as users of heavy traction were now much more careful to lighten their loads, to the great advantage of the highways.

BRIGHTON OMNIBUS LICENSING.

THE KING V. BRIGHTON CORPORATION.

In the King's Bench Division, on January 11 and 12, the case of the King *v.* Brighton Corporation came on for hearing before the Lord Chief Justice, Mr. Justice Sankey, and Mr. Justice Low. The appended report of the proceedings is abridged from *The Times* Law Report :—

A rule nisi for a mandamus had been obtained on behalf of Messrs. Thomas Tilling, Limited, directing the Town Council of the County Borough of Brighton to show cause why they should not hear and determine, according to law, an application by Messrs. Tilling for licences for hackney carriages and omnibuses, on the ground that the Corporation had not properly exercised the discretion which it had under the Town Police Clauses Act, 1847.

Mr. Montgomery, K.C., and Mr. Rowland Harker appeared for the Town Council ; Mr. Macmorran, K.C., and Mr. Barrington-Ward appeared in support of the rule.

Mr. Montgomery, in opening the case, said that from time to time Messrs. Tilling had applied for omnibus licences for Brighton, but the Council had always refused them. The reason given was that as the streets were narrow there would be danger to the public if competing companies were allowed to use them at the same time. The contention of Messrs. Tilling now was that that was not a sufficient reason for refusal. At Hove licences had been granted to Messrs. Tilling without objection ; the omnibuses therefore ran to and fro between Hove and Brighton, but while within the Brighton boundary they did not pick up passengers, so as to avoid the necessity for licences to ply for hire within that boundary. He submitted that there was no evidence to show that the Council had unduly favoured the local company or had not properly dealt with Messrs. Tilling's application.

Mr. Macmorran read an affidavit in reply. He submitted that the discretion of the Council in dealing with such an application was a discretion which could only be exercised judicially, and a decision which purported to be an exercise of discretion but was really a blind following of a predetermined rule, was not a real decision at all. He referred to R. *v.* Metropolitan Police Commissioner ([1911] 2 K.B., at p. 1,140 ; 27 *The Times* Law Reports, 573) ; Reg. *v.* Barry District Council (16 *The Times* Law Reports, 505) ; Tinkler *v.* Wandsworth, etc. (27 L.J., Ch., 342) ; Wood *v.* Widnes Corporation ([1898] 1 Q.B., 463 ; 14 *The Times* Law Reports, 192). The existing company purchased about £2,000 worth of electricity yearly from the Council, and if owing to competition the company should fail, the electricity undertaking would lose a valuable customer. Admittedly, there was need for additional means of transit ; but the Council had determined not to allow anyone but the old company to supply it, even though at the time of Messrs. Tilling's application the old company was not in a position to supply it. At the time of the application for omnibus licences by Messrs. Tilling there was also an application by them for chars-a-bancs licences. The old company also applied for chars-a-bancs licences, but the Council, without having assigned any reason, refused Messrs. Tilling's application and licensed a larger number of vehicles to the old company to make up the number required in the public interest.

Mr. Montgomery replied. He said that a mandamus should not be granted unless it had been shown that some definite wrong thing had been done.

THE JUDGMENT.

On January 20 the Lord Chief Justice, in giving judgment, said the only question was whether there was evidence to show that in refusing the licences for omnibuses the Council had acted from bias or in an improper exercise of their discretion. It appeared that the Council had taken the advice of the Chief Constable upon the traffic conditions, and had been guided by his opinion, and the Court could not possibly say that they had been actuated by improper or immaterial considerations. As regards the omnibus licences, therefore, the rule must be discharged. The case of the chars-a-bancs was somewhat different. The Watch Committee had recommended that licences should be granted to Tilling's for chars-a-bancs, and the Council had refused Tilling's application and had granted licences for extra chars-a-bancs to the local company. They had given no reason for their refusal, and in the circumstances he felt that Tilling's had made out a *prima facie* case. The principle on which the Court acted in such a case was laid down in Sharp *v.* Wakefield ([1891] A.C., 179 ; 7 *The Times* Law Reports, 389), and Reg. *v.* Bowman ([1898], 1 Q.B., 666 ; 14 *The Times* Law Reports, 303), and R. *v.* London County Council (2 K.B., at 475). The Court should be very slow to interfere with the decision of local authorities. It was the policy of Parliament to leave the decision of certain matters to those authorities, and the Court had always

Digitized by Google

MOTOR TRAFFIC.

taken the view that it could not interfere with a decision reached by a local authority that had dealt with a case on its merits without considering matters which were inadmissible, even though on the facts the Court itself would have come to a different determination. But it was the duty of the Court to interfere when it came to the conclusion that the local authority had not properly exercised its discretion and had been influenced by extraneous matters. He was sure that the Council had not intended to do anything that was not according to law, but it had strayed from the path marked out by law. So far as regarded the chars-a-bancs the rule must be made absolute.

Mr. Justice Sankey delivered judgment, in which he agreed on both points.

Mr. Justice Low said that he agreed as to the omnibus licences, but he felt some doubt as to the chars-a-bancs licences. He was not, however, prepared to dissent from the other members of the Court.

The rule was discharged as to the omnibuses and was made absolute as to the chars-a-bancs, with no order as to costs.

HILL-CLIMBING BY A DAIMLER LORRY.

One of the accompanying illustrations shows a Daimler 2-ton lorry belonging to Messrs. Walker and Sons, Whitehaven, mounting a hill leading to their tannery. It is often the case in photographs of gradients that the latter appear less steep than they really are, and this is so in the present instance, but an idea of the great steep-

ness may be got from the second view. The incline is, indeed, a severe test for any fully laden motor lorry. The Daimler makes four or five daily trips up and down this gradient, a fact which speaks well for the power and reliability of the vehicle.

BIRMINGHAM'S OMNIBUS FLEET.

Birmingham Tramways Committee on January 19 decided to purchase six additional omnibuses with Daimler chassis and Allen bodies, with garden seats in the fore part of the saloon. The department are already running forty-one omnibuses, having taken over the local omnibus company two years ago.

We have received the following letter in regard to the order mentioned above from Mr. Percy Frost-Smith, joint managing director of Messrs. Tilling-Stevens, Limited, of Victoria Works, Maidstone :—

" January 25, 1916.

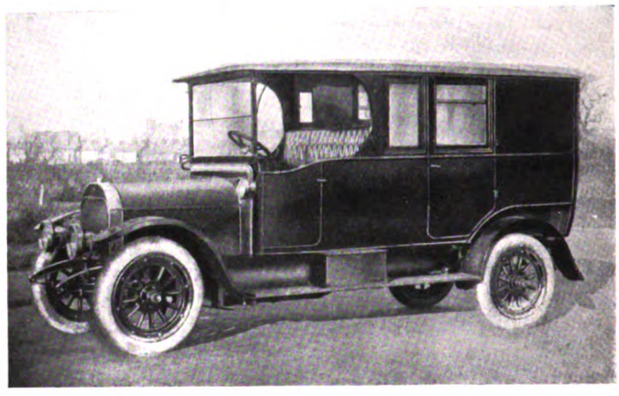
" With reference to the recent order for omnibuses placed by the Birmingham Corporation, we beg to draw your attention to the following :—

" The order for these 'buses was actually placed by the Birmingham Corporation with us on December 16 last, subject to our being able to obtain permission for their manufacture from the Ministry of Munitions. However, having regard to the fact that we are engaged on most important work for the Admiralty and the War Office, we were not allowed to build, and the order therefore was passed to the Daimler Company.

" The fact that this order went elsewhere naturally reacts on us, as the whole of the 'buses running in the Birmingham district are of our manufacture, and if the reason for the loss of this order is not generally understood, it will certainly be detrimental to our immediate and future interests."

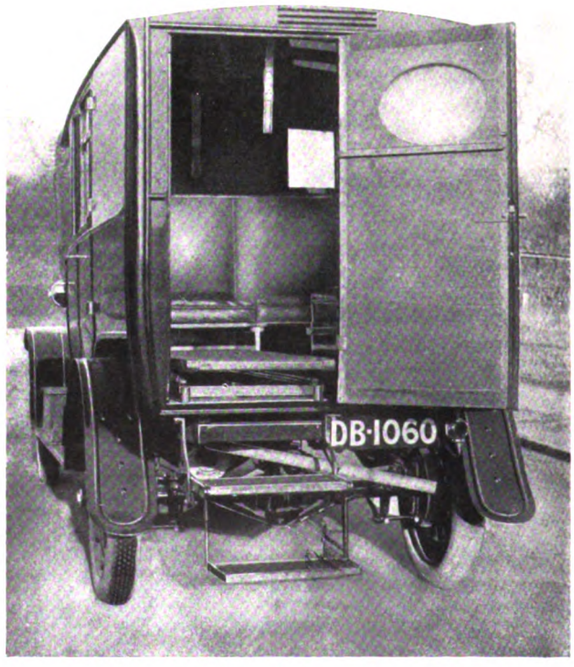
DENNIS BROUGHAM AMBULANCE.

The accompanying photographs illustrate a brougham ambulance specially constructed by Messrs. Dennis Brothers, of Onslow Works,



Dennis Motor Brougham Ambulance.

Guildford, for the Bromley Board of Guardians, Kent. When arranged as an ambulance the vehicle will carry two patients in a prone position. When used as a brougham, a seat and squab are provided across the back of the body, and the rear door is locked



Rear View of Dennis Ambulance.

from the inside to prevent it from coming open. The photographs clearly show the difference between the civilian and military requirements in respect of ambulance vehicles,

Digitized by Google

MOTOR TRAFFIC.

A NAPIER LORRY SUSPENDED BY ITS GEAR BOX.

Lance-Corporal Parris, of one of the advanced M.T. depots in France, has sent to D. Napier and Sons, Limited, the interesting photograph which we reproduce on this page. It shows a Napier 3½-ton motor lorry of the B58 type, such as is used for transport work, in an unfortunate predicament. The accident occurred as the result of a skid whilst the lorry was travelling at a high speed on a greasy road. After breaking through the rail of the bridge, the car fell into the position in which it is seen. While the car appears to be resting on the bank, the only thing that is keeping it on the bridge is, in fact, the gear box. Had the car slipped from the position shown, it would have had a drop of 20 feet before it touched the water. The driver had a very narrow escape, having to climb up from the side, and he fortunately got away without injury. The car remained in the position shown in the photograph until it could be replaced on the bridge. When this was done it was found that there was scarcely any damage, which speaks highly of the strength of the frame and of the gear box. The incident affords another proof of the Napier quality, which has been so well borne out during the course of the present war.

A Napier Lorry saved by its Gear Box.

MOTORS FOR THE ARMY.

In the Law Courts on January 21 an injunction was applied for against three Belgians and others. Counsel stated that the Belgians came to this country on the outbreak of the war and formed a company with a capital of £1,608. They obtained orders from the Belgian and British Governments for lorries, etc., amounting to over £1,000,000. After doing a certain amount of work, they received as guarantee from the Belgian Government a sum of £174,000. They proceeded to draw about £130,000 and divide it equally between them, but ultimately were arrested and deported to Calais. An injunction was now applied for with a view to tracing what had become of the money. The Judge granted an injunction restraining any dealings with certain banking accounts and stocks and shares held by the defendants.

PARCEL POST BY ELECTRIC VEHICLES.

A Report on Tests in American Cities.

The Electric Vehicle Association of America recently issued a report on the use of electric vehicles in parcel post delivery and mail collection at a number of different points in the United States. In a demonstration in Denver, a total of 46·3 miles was covered in 7 hours and 12 minutes, and an actual running time of 6 hours and 23 minutes. One hundred and fifty packages were delivered and 143 stops made, so that the time consumed in driving to and making the delivery at each stop was 2 minutes 40·7 seconds, and the average time of driving to and delivering each package 2 minutes 33·2 seconds. The average number of stops per mile was 3·06. This was a 1,000 pound van with a capacity of 18·14 kw.h. The energy consumed was 14·1 kw.h., which at 1·8d., the local rate, works out to 2s. 1·35d., or ·5d. per mile, or ·175d. per stop, or ·165d. per package.

Another demonstration was made of the collection of mail, using the same van, when 26·5 miles were covered in 4 hours and 28 minutes. During this time 147 collections were made, with 137 stops. The average time consumed in driving to and making the stops was 1 minute 57·3 seconds, and the average time in driving to and making each collection was 1 minute 49·4 seconds. The average number of stops per mile was 5·17. The cost of current in this case worked out to 22·3d., being 12·39 kw.h. at 1·8d., making the cost per mile 0·85d., the cost per stop ·16d., and the cost per collection ·15d.

Results in New York City.

For postal service in the United States it seems evident, the report adds, that the motor must necessarily supersede the horse, and during the past five or six years a number of motor vehicles have been employed. Conspicuous among these has been the satisfactory performance of 20 to 30 electric cars in service in New York City during the four-year contract period closed last year. Twelve of these trucks were employed on the introduction of the parcel post in the United States, and are now in service, making

Digitized by Google

MOTOR TRAFFIC.

deliveries from nineteen postal sub-stations in New York to addresses of large and heavy packages sent through the parcel post.

During one winter month, in 27 days these machines travelled 7,111 miles, and delivered 98,243 parcels. At this rate the parcel post truck fleet covered an average distance of 263 miles per day, or 22 miles per individual vehicle. These vehicles, it should be noted, have, however, capacities of 45 miles per charge. Deliveries were made at the rate of 3,628 parcels per day, or about 303 per day per vehicle. The average distance travelled per package delivered was 0·0724 miles, or 362 feet. At the rental paid by the Government for this delivery service, the average cost per parcel was 1·65d., not including the wages of the carrier, who accompanied the truck on its round.

A number of large machines are used for mail haulage between the New York City depots and postal stations. Some of these cars have been in service five or six years, having been used twenty-four hours per day in the year during much of this period.

Cost of Delivering 271 Parcels.

Three electric delivery wagons used by the Indianapolis Post Office have proved very reliable, and it is declared have never failed to perform any service to which they were put. In point of speed and mileage they have been found ample for parcel delivery. In a seven-hour working day the wagons averaged 271·5 parcels in 189 stops over a distance of 18·75 miles. The cost of the day's run, not including the wages of the carrier, was 23s. 3·5d. The unit costs were :—Stops per mile, 6·02 ; cost per stop, 1·625d.; cost per parcel, 1·03d.

Last year the Parcel Post Delivery Committee of the Electric Vehicle Association of America conducted a very extensive campaign with the Government officials at Washington, the postmasters generally throughout the country, central stations, and electric vehicle manufacturers, with the object of inducing the Post Office authorities to recognise the value which had been credited by the most conservative business organisations throughout the country to the electric vehicle as a transportation utility in city services.

Parcel Delivery by Electric Vehicle.

The comprehensive delivery system of Marshall, Field and Company, Chicago, the *Electrical News* states, is one of the best examples of the success of the electric vehicle in a house-to-house delivery. There are at present 230 electrics used by Marshall, Field and Company, which have an average mileage of 28 to 30 miles per day, some of the lighter vehicles travelling as far as 40 miles per day. To do the same work from 850 to 900 horses would be required.

The following is a list of some of the largest electric vehicle fleets in three other cities, gasoline (petrol) trucks being used for long hauls :—Ward Baking Company, 610 electric, 42 gasoline trucks ; Adams Express Company, 326 electric, 160 gasoline trucks ; American Express Company, 220 electric, 154 gasoline trucks ; Jacob Rupert, 145 electric, 37 gasoline trucks ; Geo. Ehret Brewery, 136 electric ; Commonwealth Edison, 114 electric, 2 gasoline trucks ; N. E. Edison, 130 electric, 3 gasoline trucks ; Gimble Brothers, 110 electric, 97 gasoline trucks ; Carson Pirie and Scott, 67 electric, 21 gasoline trucks.

STRAKER AMBULANCES FOR LONDON ASYLUMS.

The two vehicles illustrated below are the latest acquisition of the Metropolitan Asylums Board for the service of their ever-increasing radius of medical activities. The vehicles represent a departure from the standard practice, inasmuch as the type is of a general description, and the vehicles can be used as omnibuses for carrying convalescent cases or for stretcher work where the patients cannot sit.

Apart from this feature, the specification contains some special points. When a machine of this description is used for carrying stretcher cases only, the conditions to be met are, of course, very different from those when the vehicle is used as an omnibus. The problem thus presented has been solved by Mr. E. Kemp, the chief and consulting engineer to the Asylums Board, by the selection of a "C.T.K." type Straker-Squire chassis, which has a high reputation for smooth running. By specifying the "North" system of adjustable springing, Mr. Kemp has obtained a vehicle which readily takes a variety of loads and yet maintains its flexibility.

Straker-Squire Ambulances.

LONDON FATALITIES IN 1915.

Totals for the Various Types of Vehicle.

In the House of Commons, on January 20, Mr. Kellaway asked the Home Secretary how many street traffic fatalities were caused by each class of vehicle during the years 1913, 1914, and 1915, respectively, in the Metropolitan police district and the City of London.

Mr. Herbert Samuel : The total number of fatalities in 1913 and 1914 was 625 and 658 respectively. Particulars showing the number caused by different classes of vehicles in each of these years were given to my hon. friend in reply to his question of November 9 last.

The figures for 1915 are as follow :—

Horse-drawn :—	
Cabs	1
Broughams	9
Trade and commercial	162
Mechanically-propelled :—	
Omnibuses	156
Tramcars	87
Cabs	66
Private motor cars	191
Motor cycles	28
Trade and commercial	150
Pedal (i.e., push) cycles	13
Horses (ridden or led)	4

Digitized by Google

MOTOR TRAFFIC.

INSPECTION OF COMMERCIAL MOTORS.

The tenth annual inspection of commercial motor vehicles, organised by the Commercial Motor Users' Association, with the object of encouraging drivers, by means of money prizes and other awards, to take a personal interest in the driving and condition of their vehicles, and to run them without accident, will take place in London during the month of May, 1916. The usual parade of vehicles will not be held this year, owing to the difficulty of sparing vehicles from service during the present period of stress.

The organisation of these inspections, which are supported by the Royal Automobile Club and the Society of Motor Manufacturers and Traders, is in the hands of a special committee. The prize fund is subscribed by users, and by manufacturers and suppliers of vehicles, tires, bodies, fuels, and accessories. Prizes will be awarded to drivers for results obtained in written and in oral examinations, coupled with inspection of their vehicles under running conditions. In this way it is hoped to carry on the educational work among drivers, which has been one of the aims of the Association since its formation in 1903.

Entries had to be received not later than January 15, 1916. They may be for—

(*a*) Oral examination for drivers of steam vehicles and tractors.
(*b*) Written examination for drivers of steam vehicles and tractors.
(*c*) Oral examination for drivers of petrol vehicles.
(*d*) Written examination for drivers of petrol vehicles.
(*e*) Oral examination for drivers of electric vehicles.
(*f*) Written examination for drivers of electric vehicles.

Drivers may enter for all three subjects, steam, petrol, and electric, in either oral or written; but no driver may enter for examinations (*a*) and (*b*), (*c*) and (*d*), or (*e*) and (*f*).

Members of the C.M.U.A. may enter any number of their drivers free, and non-members upon payment of a fee of 10s. for each driver entered.

The examinations will be based on the information contained in the lectures delivered by the inspecting engineer (Mr. G. W. Watson) during 1915, which have been published in book form under the title of "The Commercial Motor Drivers' Handbook." The foregoing lectures will be supplemented by general reviews and problems relating to steam, petrol and electric vehicles, which will be printed and sent to the drivers by post. The oral examinations will be spread over several evenings, and the written examinations will be held on separate evenings.

The inspecting engineer will visit each garage before the written and oral examinations, and his reports on those visits, together with the marks obtained by each driver in the examinations, will be recorded by the committee, of which Mr. W. G. Lobjoit is chairman, and awards based thereon. Each driver obtaining more than a fixed percentage of marks will receive a money prize, a badge, or a certificate.

The following cash prizes will be awarded by the Inspection Committee:—

CHAMPIONSHIP PRIZES (WRITTEN EXAMINATION).

Steam.—£5, £3, £2, and ten prizes of £1.
Petrol.—£5, £3, £2, and ten prizes of £1.
Electric (provided by the Electric Vehicle Committee of the Incorporated Municipal Electrical Association).—£5, £3, and £2.

The winners of 1st, 2nd, and 3rd prizes will each receive a special badge and certificate, whilst £1 prize winners and each driver who gains more than a certain percentage of marks will also receive a certificate. Winners of 1st prizes in the 1913, 1914, or 1915 examinations are not eligible to take a 1st or 2nd prize in this section, but they will be allowed to sit for their examination, and their order of merit will be announced.

C.M.U.A. GENERAL PRIZES (ORAL EXAMINATION).

These prizes, which will amount to about £50 in total value, subdivided into cash prizes of £2, £1, and 10s., will be awarded at the discretion of the Inspection Committee to drivers of vehicles, based on the number of marks awarded. Drivers who do well in this examination will also receive certificates.

The first entries received were 11 drivers of the Gas Light and Coke Company, and 7 drivers of the Stores Department of the General Post Office.

COMMER CARS EMPLOYEES' WAR FUNDS.—The employees of Commercial Cars, Limited, Luton Works, have sent £75 to the Bedfordshire Territorial Force Comforts Fund and £25 to the Bedfordshire Prisoners of War Fund. The total of £100 represents 50 per cent. of the contributions to Commercial Cars, Limited, Annual Christmas Fund, the workmen thus sacrificing money that they had subscribed for their own enjoyment.

MOTOR VEHICLES FOR MUNICIPALITIES.

MALVERN COUNCIL have bought a motor car for the use of the gas manager.

SELBY COUNCIL have applied for sanction to borrowing £1,100 for the purchase of a petrol fire engine.

NORTHAMPTONSHIRE COUNTY COUNCIL have adopted a proposal to purchase two motor tractors and four wagons.

RAMSGATE COUNCIL are considering the question of purchasing electric wagons for the collection of house refuse.

BRADFORD SEWAGE COMMITTEE have agreed to purchase a motor car for the resident engineer "at a cost not exceeding £175."

BRADFORD CLEANSING COMMITTEE have advised the Council to purchase an additional 6-ton Yorkshire Commercial motor wagon.

DOVER COUNCIL were informed at their January meeting that the three Edison electric dust vans are giving satisfaction. Three similar vehicles are on order.

GLASGOW COUNCIL have consented to the employment of women to replace the drivers who will be called up for service from the Corporation's motor car garage.

SHEFFIELD HEALTH DEPARTMENT have accepted the offer of the electric supply department to provide, at a cost of £185, switchboards and fittings for charging electric vehicles.

MOTHERWELL COUNCIL have been advised by the Streets Committee to appoint a committee to consider the question of adopting motor traction for street cleansing and other work.

WALSALL CORPORATION have received delivery from the Daimler Company, Coventry, of three motor omnibuses that have been urgently required for meeting the demands of the traffic.

BIRKENHEAD COUNCIL recently took delivery of a 60 H.P. 400-gallon turbine motor fire engine from Dennis Brothers (1913), Limited. The machine was driven from Guildford to its destination.

NEWCASTLE ON-TYNE COUNCIL submitted evidence at a Local Government Board inquiry on January 27 in support of their application to be allowed to obtain a loan for the purchase of a motor fire engine and accessories.

SOUTH SHIELDS COUNCIL have adopted the recommendation of the electric supply department for the purchase of an electric tipping wagon to be used for conveying ashes from the electricity works. The cost of the vehicle is estimated at £850.

STOCKPORT ELECTRICITY COMMITTEE have placed an order with the Yorkshire Commercial Motor Company for a five-six ton steam wagon, fitted with mechanically-operated end-tipping body 12 ft. by 6 ft. 6 in. by 3 ft. deep, with rubber tires and three-speed gear, at £695.

ABERDARE COUNCIL, before putting into force their powers to run motor omnibuses in connection with their railless trolley cars, have consulted Mr. S. Sellon as to the most suitable type of vehicle to purchase. The chairman of the Tramways Committee and the tramways manager have visited York and Sheffield and inspected the vehicles in use in those cities, and they have advised the Council to adopt petrol cars as likely to prove more suitable for the hilly nature of the district.

SPEED AT NIGHT.

In reference to an agitation in London to secure a reduction of motor omnibus speed at night, it may be mentioned that the time tables of the London General Omnibus Company have been twice extended since the war began. An official of the company has stated that he could not advocate reducing the speed of night traffic to eight miles an hour, as there is no necessity for any driver to drive furiously, no penalty being imposed for delays. Safety of the road, added the official, is the consideration first urged upon all. Although over 2,000 of the most experienced drivers were on war service, the list of fatal accidents of the company was six less last year, the totals for the past two years being 120 and 126.

Croydon Corporation, on January 24, adopted a recommendation from the Roads Committee that "a representation be made to the Commissioner of Police for the Metropolis of the desirability of reducing after dark the speed of the motor omnibuses travelling in the borough, and with regard also to the regulation of motor omnibus traffic, particularly in relation to recognised places where these vehicles are likely to clash with the fixed stopping place of the tramcars."

Birmingham Tramways Department, on January 17, reduced the speed of their omnibuses and shortened the Moseley end of the New Street and Moseley route owing to the stringent lighting regulations that came into force on January 10. The alterations have been made in order to ensure the vehicles running to time.

Digitized by Google

MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

C. C. Vandervell and Company, Limited, have received a large repeat order for electric lighting sets from the London General Omnibus Company.

Post Office Tire Contract.—The Postmaster-General has placed a contract with the Midland Rubber Company for the supply of solid rubber tires for a period of twelve months.

London County Council Vans for War Service.—The Stores Committee of the London County Council have placed at the disposal of the War Department two motor vans that were in course of construction by Thomas Tilling, Ltd.

Corporation Omnibuses and Road Widening.—Sheffield Tramways Committee have agreed to contribute one-third of the estimated cost of widening the road on the Lodge Moor route used by the motor omnibuses of the department.

Lack of Omnibuses and Drivers.—Owing to inability to obtain the necessary omnibuses and drivers, Rotherham Tramways Committee have not been able to inaugurate the proposed motor-omnibus service between Greasborough and Rotherham.

Motor Cars for Parcels.—Mr. A. Ellis, general manager, Cardiff Corporation Tramways, has stated that if motor cars had been obtainable the parcels department at Christmas would have been developed with relays of motor cars in collection and delivery.

Double Fares on Night Omnibuses.—In order to recoup the company for the loss entailed by the running of the night omnibus service from Cricklewood to Liverpool Street, the fares have been increased approximately 100 per cent. Fivepenny tickets, however, are only raised to eightpence.

Curtailed Services at Macclesfield.—Owing to the shortage of labour the motor omnibus services in Wilmslow and Macclesfield districts have been curtailed, while penny stages have been abolished. On account of the latter occurrence, Wilmslow Council have decided not to grant further licences until penny stages are resumed.

Front Wheel Guards.—The London General Omnibus Company are experimenting with two oval rings of rubber fixed in advance of each of the front wheels of some of their vehicles. The lowest of the rings is about three inches from the ground. All the London companies' omnibuses are now provided with the rear wheel guards first introduced by Mr. Iden, the chief engineer of the London General.

Useful Publicity Work.—The latest advertisement issued by the London General Omnibus Company reads as follows:—"Hailing a 'bus in the darkened streets.—When hailing a 'bus, passengers should stand as near as possible to a street lamp, and give a signal to stop the 'bus by holding up the hand. This gives the motor-'bus driver an opportunity of seeing a passenger some yards in advance and bringing the 'bus to a stop."

Utility of Omnibuses to a Tramway Undertaking.—The utility of the motor omnibus was demonstrated in the suburban area of Aberdeen on January 13. During a gale a tree was uprooted and in its fall brought down a considerable length of overhead wire on the track of the Suburban Tramways Company. Mr. A. Wilkie the manager, arranged an omnibus service during the two hours that the tramways were interrupted.

Edison Chassis with Tipping Body.—An error crept into the description, published in our issue dated January 13, of the Edison electric chassis supplied with tipping bodies to various corporations. The power capacity and the capacity of the body there stated are those of a small vehicle supplied to another corporation. The correct power capacity was given on page 71 in the description of the 2-ton chassis. Body capacity varies according to the cubic weight of material.

Colour of Tire Material.—Mr. P. W. Litchfield, the factory manager of the Goodyear Tyre and Rubber Company, says it is quite unsafe for any amateur to attempt to assess the value of a tire from the colour of the material of which a tire is made. It would therefore be regrettable if motorists permitted themselves to become prejudiced on the point of colour. The consequence of their doing so would merely be to limit the useful investigations that are continuously being carried on by experts.

Women Omnibus Conductors.—Owing to the number of conductors who have to take up duty under the Military Service Act, and to the impossibility of replacing them by men, the London General Omnibus Company have now decided to employ women. The sex has been so employed on the vehicles of Thomas Tilling, Limited, since November 2, within two weeks of the withdrawal of the police prohibition. On the Tilling-Stevens vehicles, owing to the absence of jolting in starting and stopping, the work is less arduous than it is likely to be on the petrol machines.

An Opening for Motor Vehicles.—Subject to the North British Railway Company obtaining the consent of the Secretary for Scotland "to carry on the business in all its departments," the company will, on July 1, take over the carting business of Messrs. Mutter, Howey and Company, of Edinburgh, for £63,677. The firm has for many years acted as carting contractors for the company in Aberdeen, Bathgate, Berwick-on-Tweed, Dundee, Dunfermline, Edinburgh, Galashiels, Hawick, Kelso, Kirkcaldy, and Sinclairtown Leith, Linlithgow, etc.

Orders for Dennis Vehicles.—Dennis Brothers, Limited, of Onslow Works, Guildford, have received an order from the Blackpool Tradesmen's Association for an ambulance exactly similar in all details to the special type of ambulance built by Messrs. Dennis for the London County Council. Repeat orders for motor vehicles have been received from Messrs. Lever Brothers and the British Petroleum Company, and standard subsidy lorries have been supplied to Messrs. C. and G. Yeoman, of Canterbury, the Hants. and Wilts. Laundry Company, Nottingham Corporation Tramways, Messrs. Henry Ashwell, of Nottingham, etc.

Electric Starting of Commercial Vehicles.—The engineering department of the Reo Motor Truck Company, of Lansing, Mich., as the result of a series of experiments with their new 15-cwt. petrol motor delivery van, state that the results obtained go to show that an engine starting outfit will more than repay first cost in the saving of petrol effected during the first year of its use, owing to the engine being stopped instead of allowed to run while deliveries are being made. It is also claimed that it will have a marked effect on the cost of upkeep, due to the elimination of wear and tear. The company have decided to adopt an electric engine starting set as a standard part of the equipment of the Reo vehicles.

DUNLOP RUBBER COMPANY.

Mr. A. du Cros, M.P., presiding at the annual meeting of the Dunlop Rubber Company, said the total net profit of the year amounted to £435,000, from which had to be deducted the parent tyre royalty, amounting to £23,500, leaving a net balance of £411,000. This exceeded the profits of the previous year by £30,000, although the actual increase in trading profit was really £37,000, because of £7,000 odd included in the previous year in respect of premiums on shares issued. The actual sum available for distribution was £61,000 better than the previous year, the company having had to provide £31,000 last year for the expenses of new capital issues. Many exceptional charges arising directly out of the war had had to be met out of profits. The directors had to deal drastically with these, believing that this was a time for caution and conservation. The record profits had not been gained by taking advantage in any way of war conditions to increase the cost of goods. The improved profits were due, firstly, to increased output and sales in conjunction with a high standard of manufacture, and, secondly, to reduced costs, the result of improved organisation and the expenditure of capital on improved processes. He could speak particularly of a great advance in the result obtained from their solid tires. Comparing results of Dunlop solid tires sold on a mileage basis which covered nearly three hundred millions of miles, they showed steady improvement month by month. Of the profits it was proposed to divide 45 per cent., amounting to £194,000, the preference shares taking £44,800 and the balance going to the ordinary shares. If the directors' recommendation of 15 per cent. for the year were accepted, the balance of £217,000 would be either carried forward or applied in the reduction of plant and machinery, as against £171,000 last year. It had been suggested that the dividend might have been higher, but the directors thought it inadvisable at this critical period of the war. With reference to the new works, the chairman said that in the past the company had been unable to meet the demand for its productions. Government orders were very urgent, and it was partly owing to this that the buildings were undertaken. There existed also a very great demand for motor transport at home owing to the congestion on the railways. The new factory, covering seven acres, and giving facilities for further extensions, would enable them to increase the output in all departments, and in the course of time, not only to meet the demand, but increase the stock held by the company. With regard to the spinning and weaving mills specially erected near Rochdale, the chairman said the freehold site was nearly thirty acres, and the present factory nearly seven acres. When the mills were absorbed into the general business of the company a most important and substantial addition to the profits would have been made. The directors, however, attached more importance to the fact that a decided advance would have been made in the quality and durability of Dunlop tires, and it was in this direction that they hoped to reap the reward of their initiative.

The report was adopted, and the meeting agreed to increase the capital of the company to £2,000,000 by the creation of 200,000 preference shares of £1 each.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 9. | LONDON, SATURDAY, FEBRUARY 12, 1916. | [Established in 1892.]

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BIRKENHEAD.

BIRKENHEAD CORPORATION ELECTRICITY SUPPLY.

CONDUCTOR CABLE, ROTARY CONVERTERS, ETC.

The Corporation of Birkenhead invite tenders for the supply and laying of:—

Extra-high-tension Oval Split Conductor Cable,
Two Rotary Converters (one 300-kw., one 450-kw.) with Switchgear.

Copies of the Specifications, with Forms of Tender and General Conditions, can be obtained on application to the Borough Electrical Engineer, Mr. G. P. Shallcross, Corporation Electricity Works, Craven Street, Birkenhead, on the payment of a fee of £1 1s. for each Specification, which will be returned on receipt by the Corporation of a bona-fide tender.

Tenders, which must be on the forms supplied, sealed and endorsed "Tender for Electric Cable" or "Tender for Rotary Converters and Switchgear," as the case may be, must be sent in to me not later than 9 a.m. on Monday, March 6, 1916.

Parties whose tenders may be accepted will be required to enter into a contract containing a clause as to the payment of the rate of wages and the observance of the hours of labour and conditions recognised and agreed upon between the Trades Unions and the employers in Birkenhead or in the locality in which the work for carrying out the contract is executed, as the case may be.

The Corporation do not bind themselves to accept the lowest or any tender.

(By order) J. FEARNLEY,
Town Clerk.

Town Hall, Birkenhead.
February 9, 1916.

SOUTH INDIAN RAILWAY COMPANY.

STEEL TYRES.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of Steel Tyres (900), for carriages and wagons.

Specification and form of tender may be obtained at the company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co., Ltd., marked "Tender for Steel Tyres" must be left at the offices of the company not later than one o'clock on Wednesday, February 23, 1916.

The company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 20s. for each copy of the specification.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the company, 3, Victoria Street, S.W.

91, York Street,
Westminster, S.W.
February 1, 1916.

WARRINGTON CORPORATION TRAMWAYS.

The Electricity and Tramways Committee is prepared to receive tenders for the supply of:—

Uniform (men and women conductors)
Mackintoshes
Capes
Tickets
Punches

for a period of one year from date of contract.

Particulars for the above material may be obtained from the Tramways Manager, Car Sheds, Warrington. Tenders addressed to the Chairman of the Electricity and Tramways Committee, Town Hall, Warrington, and endorsed "Tenders for ——," to be sent in to the Town Hall not later than 12 o'clock noon on Tuesday, February 29th, 1916.

J. LYON WHITTLE,
Town Clerk.

CHINESE GOVERNMENT RAILWAYS.

CANTON-HANKOW RAILWAY (HUPEI-HUNAN SECTION).

BOGIE FREIGHT CARS.

Tenders are invited for:—

75 High-sided 30-ton Steel Bogie Freight Cars,
75 Low-sided 30-ton Steel Bogie Freight Cars,

for the above railway.

Conditions of tender, drawings, and specifications may be obtained from the Consulting Engineers, Messrs. C. P. Sandberg, Palace Chambers, 9, Bridge Street, Westminster, S.W., on payment of 10s.

Tenders to be delivered to Messrs. C. P. Sandberg before 11 a.m. on March 11, 1916.

BOROUGH OF LEIGH, LANCS.

TURBO-ALTERNATOR, ETC.

Tenders are invited for the supply and erection of the following plant:—

One 2,000 Kw. Turbo-Alternator, 6,600 volts.
One Surface Condenser for above.
One set of pumps for water supply.
One 1,000 Kw. rotary or motor converter switchgear for above.

Specifications and particulars may be obtained from Mr. Arthur T. Smith, Electricity Works. Tenders to be delivered at the Town Hall, addressed to the Chairman of the Electricity Committee, not later than 12 noon, February 18, 1916.

W. H. COWBURN,
Town Clerk.

Leigh, Lancs.
January 25, 1916.

POSITIONS VACANT.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY DEPARTMENT.

The Newport Corporation require the services of Junior Engineers-in-Charge and Switchmen.

Junior Engineers-in-Charge must have served their time as pupils or apprentices in an electricity undertaking, and have had some experience of extra-high-tension 3-phase supply. Wages, £2 2s. per week.

Switchmen must have had experience in the operation of extra-high-tension and low-tension switchboards in stations of not less than 5,000 kw. capacity. Wages, 35s. per week.

Applications in candidates' own handwriting, together with copies of experience and references, to be sent in at once to the undersigned.

War Service Badges will be issued.

A. NICHOLS MOORE,
Borough Electrical and Tramways Engineer.

Town Hall, Newport, Mon.
February 1, 1916.

Digitized by Google

MILEAGE AND TIMETABLE CLERK.

Wanted a Mileage and Timetable Clerk for a large tramway system in the Metropolitan area. Applicants must have had considerable tramway experience, and preference will be given to men ineligible for military service. Applications, stating age, experience and salary required, together with copies of three recent testimonials, to be forwarded to Box No. 868, c/o "The Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

DRAUGHTSMAN.

Wanted, for temporary engagement, a draughtsman to prepare plans, etc., for the construction of an Electricity Generating Station. Applications, stating age, experience, salary required, and when at liberty, accompanied by copies of two recent testimonials, to be addressed to the Borough Electrical Engineer, Eccles Corporation Electricity Works, Cawdor Street, Patricroft, Lancs.

ELECTRIFICATION ON THE NORFOLK AND WESTERN RAILWAY.

24 pp. and cover. 13½ in. by 9¾ in.
With Map, 7 Drawings and 20 Half-tone Illustrations.

Price 2/-

Reprinted from THE RAILWAY AND TRAMWAY WORLD.

One of the most complete and comprehensive electric railway articles that has come under our notice. Particulars are given of the Vivian-Bluefield equipment with single-phase transmission and three-phase motors.—*Electrical Industries.*

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Pole Paints

As supplied to important Companies at home & abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples & Prices on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons' Tramway Material.
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

For the United Kingdom—Twenty five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

COMPARATIVE TRAMWAY ACCOUNTS.

The latest Municipal Tramway Accounts are summarised in

THE TRAMWAY AND RAILWAY WORLD
OF FEBRUARY 10, 1915.

The capital and working reports are clearly and systematically arranged so that any required fact can be readily ascertained, while comparisons of results of the different systems can easily be made.

Particulars are given under the following heads:—

Capital Account :—
- Borrowing Powers.
- Borrowing Powers Exercised.
- Unexhausted Borrowing Powers.
- Capital Expenditure per mile of Single Track.
- Loans Outstanding.
- Sinking Fund and Loans Repaid.
- Depreciation, Renewal and Reserve Funds.

Gross Receipts :—
- Traffic.
- Other Revenue.
- Total.

Working Expenses :—
- Traffic.
- General.
- Repairs and Maintenance.
- Power.
- Total.

Gross Profit on Working.

Reductions from Gross Profit :—
- Interest.
- Sinking Fund.
- Income Tax.
- Depreciation and Renewals.
- Sundries.
- Total.

Net Surplus or Deficit.

Appropriation of Net Surplus :—
- Carried Forward.
- Reserve.
- Relief of Rates.

Percentage of Operating Expenses to Total Revenue.

Receipts per Car Mile :—
- Average Total per Car Mile.
- Average Traffic Total per Car Mile.

Operating Expenses per Car Mile :—
- Traffic.
- General.
- Repairs and Maintenance.
- Power.
- Total.

Average Operating Expenses per Car Mile (excluding Power Cost).

Energy Consumption :—
- No. of B. of T. Units used.
- Cost per Unit.
- Units used per Car Mile.

Traffic Records :—
- Population served.
- Car Mileage.
- Passengers Carried.
- Passengers Carried per Car Mile.
- Average Fare per passenger.
- Average Journeys per head of population served per annum.
- Average Car Miles per day per Car.
- Traffic Revenue per Mile of Single Track.
- Average Traffic Revenue per annum per head of population served.
- Operating expenses per passenger.
- Average distance of 1d. fare.
- Average fare charged per mile.
- Average speed per hour.
- Average Car hours per day.
- Average number of Cars in use daily.
- Number of Cars in stock.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, FEBRUARY 12, 1916.

THE LONDON TRAMWAY POSITION.

Just as all the elements that are best in British life are now for the State and none for party, so there is hope that the purifying trials of the war have brought those who are financially responsible for the conduct of London street transit into a frame of mind in which they will not fail to arrive at an agreement satisfactory to all concerned. The only matter for regret is that a considerable waste of public and private resources has been taking place owing to the failure to come to an amicable understanding several years ago. On that occasion the blame rested on the Highways Committee of a County Council that was then, and still is, composed of a strong majority of the Municipal Reform Party. Encouraged by the ease with which they had been able to effect through running and booking arrangements with tramway and underground railway units of the allied traffic undertaking companies, the Committee proposed to enter into negotiations for securing a working agreement between the Council's tramways and the omnibus undertaking. Unfortunately they were deterred by a newspaper outcry that had no support from the ratepayers or the travelling public, whose sole anxiety is to avoid the need for levying a rate for tramway purposes and to secure the best possible facilities for travelling at reasonable fares. Under the combined influence of unsatisfactory traffics entailed by the war and the waste of the national resources that the working of London's surface traffic has exhibited, it is not likely that any contrary voice will be raised to the attempt now being made to eliminate that waste, thus at the same time improving the financial prospect of both undertakings. Competition, whether in road or railway transportation facilities, has wrought disaster when carried on under the conditions prevalent in London. The most recent example was afforded by the motor omnibus working prior to the amalgamation of the most powerful companies and the making of a running arrangement with the minor undertakings. The greatest credit for urging the bringing about of the conference that is now in progress rests with the Highways Committee, who, as long ago as July 27 last, secured the assent of the Council to such a step with a view to avoiding the waste in men, materials, and money due to the duplication of transit services. The Highways Committee's representatives appreciate the grave nature of the considerations involved in their deliberations, for early in February the Committee presented, in response to the request of the Finance Committee, a report giving their views upon the position of the tramways as disclosed by the approximate results of the working during the half-year ended September 30, 1915. The Finance Committee also desired to be informed of the steps that the Highways Committee propose should be taken to improve the financial position of the undertaking. In their report the Committee attribute their difficulties to the strike of employees and the extra expenditure entailed by the increase of wages, war allowances, and the enhanced cost of materials. The war, too, has prevented the carrying out of the scheme for reducing congestion, abolishing dead ends, and extending the lines to well-recognised traffic centres. The Committee declare that there is no prospect of meeting the heavy extra outlay falling on the tramways by passing it on to the public in higher fares. Where, then, can they turn for alleviation of the outlook? The Committee supply the best answer by stating that they consider the conference now proceeding between representatives of the Committee and of the Omnibus Company, under the chairmanship of a representative of the Local Government Board, affords, so far as can be seen, the only favourable opportunity for speedily placing the tramways undertaking on a favourable financial basis. They consider it possible that an arrangement might be made beneficial to both undertakings and advantageous to the travelling public.

THE MAINTENANCE OF SERVICES.

Rotherham Tramways Committee having found it impossible to secure new cars, are endeavouring to purchase second-hand vehicles from other authorities. The need for additional rolling stock is urgent, as none has been obtained since 1909. There has been nearly a hundred per cent. increase of traffic since then. For the last month of 1915 the receipts exceeded those of the corresponding period of 1914 by £618.

Up to the present there has been no complaint of the public in Leeds being inconvenienced by the earlier running of the last cars at night. The alteration does not apply on Saturdays and Sundays. Mr. J. B. Hamilton, the general manager, has stated that the tramways department are directing their principal efforts to supplying the demand for cars for munition workers at all hours.

L.C.C. TRAMWAY MATTERS.

At last Tuesday's meeting of the London County Council a number of tramway reports were presented.

PROCEEDINGS UNDER BY-LAWS.

From December 9, 1915, to February 3, 1916, proceedings were taken against seven persons for obstructing tramcars, the breakdown of a defective vehicle on the track, assaults on a passenger and on employees of the Council, and damage to a tramcar. In three cases fines were imposed with costs, in one case a fine only, and in the other cases the summonses were dismissed.

SPECIAL TRACKWORK SUPPLIES, ETC.

The recommendation of the Highways Committee that tenders should be invited from selected firms for the supply during 1916–17 of tramway fittings, equipment, etc., was confirmed, as was also the recommendation that the chairman and vice-chairman of the Committee should be authorised to open tenders due on February 29 for the supply of driving and pony wheel steel tires.

On July 29, 1914, the Council accepted the offer of Dick, Kerr and Company, Ltd., to execute the work in connection with the doubling of the single line of tramways in Graham Road, at Mare Street, and a street widening. The Highways Committee stated that they had now agreed to £667 for tramway work and £854 for the paving works for widening, being a total of £1,521.

The Acme Flooring and Wood Paving Company, Ltd., have been instructed to repair the sectional wood paving adjacent to the 18-inch tramway margins in Stamford Hill and Kingsland Road, at a net cost of £368.

The contract of Hadfields, Ltd., for the supply of special trackwork for the construction and maintenance of the tramways will expire on July 29, 1916, and the Highways Committee have arranged for its extension for one year, and thereafter until determined by twelve months' notice. The prices are to be revised at intervals of three months, the new prices to be based on the rates

Digitized by Google

of wages and cost of material compared with the average figures therefor for the three months preceding August 1, 1911.

The following tenders were accepted for foundry plant for the central car repair depôt, comprising (a) two double-head grinding machines, B. R. Rowland and Company, Ltd., £90; (b) a coke-breaking machine, T. and R. Rees, £73; and (c) shafting, bearings, etc., Alldays and Onions Pneumatic Engineering Company, Ltd., £39 12s.

An order has been placed with the Morgan Crucible Company, Ltd., for carbon brushes, at £14 10s. a thousand, and with Le Carbone at £13 10s. 10d. a thousand, the total expenditure being estimated at £264.

The Highways Committee have sanctioned the purchase of tramway materials, etc., including the cost of small works and repairs, at an estimated cost of £8,023. Tenders have been accepted for the purchase of 67 lots of old tramway plant and materials, the total amount realised being £6,026.

ELECTRIFICATION DEFERRED.

On February 11, 1915, the tender of Dick, Kerr and Company, Ltd., amounting to £60,566 9s. 5d. was accepted for the reconstruction of the trackwork of the tramways in Burdett Road, Grove Road, etc. An intimation was subsequently received from the Treasury that the capital expenditure would not be sanctioned. The Highways Committee have arrived at a settlement with the contractors under which the Council have taken over the materials already delivered in London, and the company will be reimbursed for certain out-of-pocket expenses, including sums in respect of cancellation of contracts. On this basis the sum to be paid to the company will amount to about £6,875. The materials included in the arrangement are of the value of £6,350, and these will be used for future construction work.

The Highways Committee have arranged for the tramway margins in Bow Road and East India Dock Road to be repaved by Poplar Borough Council, at a rate of 8s. 11d., plus 10 per cent., a lineal yard for stone paving, and 9s. a lineal yard for wood paving. The cost of the work is estimated at £400.

MISCELLANEOUS BUSINESS.

It has been arranged that two or more tramcars shall be lent to Bexley Urban Council, subject to that Council maintaining the cars and paying the capital charges in respect thereof, the cost of the annual renovation, and a sum to be agreed upon for their use.

The Highways Committee have arranged for the recovery from the Sun Fire Office of £3,415 18s. 11d. to cover the cost of repairing the damage caused by fire at Greenwich generating station on December 11, 1914.

For the use of Greenwich generating station during the quarter ended December 31, 1915, 28,241 tons of coal were purchased at a cost of about £36,755.

DISTURBANCE OF TRAMWAY TRACKS.

MR. C. JESSON asked the Chairman of the Committee on War Estimates whether his attention had been drawn to the extent in which tramway thoroughfares were constantly being broken up successively by public authorities and companies who had statutory rights to lay pipes and mains therein, thereby causing inconvenience to traffic and danger to the public; and whether the Committee had considered the possibility of arrangements being made whereby such waste might be avoided or reduced.

MR. R. C. NORMAN (Chairman of the Finance Committee) replied that a sub-committee had under consideration on November 16, 1915, the question of the opening up of streets. It was suggested that steps should be taken to obtain co-ordination between public bodies and companies. The Clerk advised that the question did not come within the reference of the sub-committee, and no action was taken.

WOMEN CONDUCTORS—EXTENSION OF TRAILER SERVICE.

MR. J. D. GILBERT, M.P., asked for information on the number of women conductors employed; whether they were all employed for a full day's work, and if so, for how many hours they were on service, and what time off they were allowed?

MR. G. H. HUME (Chairman of the Highways Committee) replied that 192 women had been engaged to act as conductors, and they worked the same hours on the particular duties allocated to them as the male conductors. The average actual work was 8 hours 24 minutes; and the average relief 3 hours 3 minutes.

MR. J. D. GILBERT inquired whether trail cars would be placed on the Brixton and Streatham route, and why all the trailers seemed to have been placed on the Clapham and Tooting route, where there was no omnibus service.

MR. G. H. HUME, in reply, stated that experimental runs had been made on the Brixton route, and arrangements had been devised for an increasing number of trailers to be put into service. Now that the equipment of the Tooting route had been completed, the Streatham route was to be dealt with.

MR. G. A. HARDY inquired whether more cars could be put on the Dulwich route. It would be the means of conveniencing thousands of passengers.

MR. WILSON made a similar plea for the Streatham route.

MR. G. H. HUME said that the Highways Committee were conscious of this inconvenience, but they had not sufficient men to send out more cars. They were taking on conductors as rapidly as possible. It was surprising that there were not more cars unused.

All tramway reports were adopted.

Women as L.G.O. Conductors.—The London General Omnibus Company intend to employ women as conductors on their vehicles, owing to the shortage of men. The rate of payment will be the same as for the men they replace. There is a proviso that the work shall be similar to that of the men, in order that the full rates shall obtain.

TRAMCAR ACCIDENTS.

GATESHEAD CAR IN OVERTURNING KILLS FOUR PEDESTRIANS.

On the night of February 5 one of the Gateshead and District Tramways Company's single deck, single truck cars ran back down the steep hill at Bensham Bank, left the rails at the curve at the foot of the descent, and overturned. Four pedestrians were caught by the overturned car and crushed to death. Minor injuries were received by a number of passengers, but one man, together with the woman conductor, sustained fractured legs, owing to being pinned under the edge of the canopy. It appears that the car was waiting at a loop for a down car to pass. As the latter was apparently held fast at the entrance to the loop, the motorman of the up car, who had had about three months' experience, applied his brakes and walked up the hill to the other car. Several persons boarded the up car, which then began to run down the hill.

At the inquest, which was held on February 8, Motorman Jane (20) said he had been driving about three months. During the journey on which the accident occurred, he should have passed a car at a loop on Saltwell Road. The car was not there, and he went on to Bensham Road, where he saw the other car in a loop further up the hill. A pedestrian told him there was a row on at the other car, and witness went up to it, leaving the hand-brake of his car properly on, and the handle on the controller. He did not inform the conductress before leaving the car, and he had only gone a few yards when he saw the lights of his car were missing. On running to the bottom of the bank, he found his car had jumped the metals and overturned. The Coroner produced a copy of the rules for the employees of the company, and asked witness if he had one. Witness replied that he had not; he had seen one, but had not read it through. He had seen motormen leave their cars to go to the assistance of other drivers. He ought to have told the conductress he was leaving, but he did not think of it. By Mr. J. Wilson (for the relatives): If he had been going down hill he would have put the slipper brake on. The hand brake was not liable to move, but the weight and movement of more passengers getting on would partially release the brake. The driver of the other car spoke to ringing his gong to call Jane to his assistance.

Mr. Duncan P. Morrison, engineer to the company, said the brakes were examined every ten days. The brakes were still in good order. There was no rule forbidding a driver to leave the car. It was a question of judgment. In this case the driver should not have left the car. He should have sent the conductor. Perhaps in ordinary times a man of 20 would not have been put on as a driver. The driver in the present instance should have applied his slipper brake. The increased weight of the passengers who boarded the car caused the car to run back. The jury returned a verdict to the effect that "the deceased were accidentally crushed through the overturning of a tramcar which ran away, owing to the additional weight of passengers, during the temporary and wrongful absence of the driver."

On February 9 the motorman was remanded at Gateshead Police Court on a charge of causing the deaths of the four persons killed in the accident. Bail was allowed.

A NEWCASTLE MISHAP.

Two vestibule platform cars of the Newcastle-on-Tyne Corporation Tramways collided early on the morning of February 5 in Barrack Road, a comparatively flat thoroughfare. The vehicles were going in the same direction, but one had stopped in order that the life-guard, which had dropped, might be attended to. While this was being done the following car ran into it, apparently owing to a faulty application of the brakes by the auxiliary motorman. On one car no glass was broken, whilst in the other case the glass of the vestibule was shattered and part of the frame was damaged. No passenger was hurt, but the female conductor of the first car was slightly injured.

DUDLEY CONDUCTOR CHARGED WITH MANSLAUGHTER.

The Dudley Coroner on February 4 concluded the inquest on one of the two persons who were killed as the result of a Dudley and Wednesbury tramcar running down a hill in the absence of the motorman and overturning at a curve. George Maddocks, an inspector in the employ of the Birmingham and Midland Tramways Company, gave evidence that the motorman left his car and went to the car from Birmingham to fetch his tea. The motorman returned, and witness lost sight of him, thinking he had got on his car. The conductor gave the signal to start, took the brake off, and the car started. On an incline like this the car usually started on the release of the brake without any application of power. Witness saw the conductor give the hand-bell signal, but he heard no response from the driver. There was a lot of unnecessary bell-ringing between the Handsworth and Wednesbury cars as they started, and the Wednesbury conductor continued ringing as his car moved away. It seemed as if it were a parting salute. The Coroner said he had had it demonstrated that the conductor should never release the brake till he had got his answering signal from the motorman. By the jury: He considered the conductors were having a little game, and the conductor of the overturned car momentarily forgot himself. George Fenn, motorman, who had been a driver since September 15 last, said he arrived at 5.18, and had only two minutes before he had to start. He locked the wheels with the hand-brake, and followed the passengers through the car. He had had a copy of the rules, and had read them, but did not know that was a rule. He placed the reversing key on the controller, and notified the conductor, who came round, that he was going to the Tividale car to get his tea. When he had got his tea, he saw his own car two poles down the road. He sprinted after it, and shouted, expecting the conductor would pull up by the hand

Digitized by Google

brake at the rear. The conductor could have stopped the car by going over the top to the front platform, or by the electric brake. When he reached the overturned car he did not look for the reversing handle. He thought more of the people who needed attention. He ought to have taken the reversing handle away with him, and to have left the controller handle in a neutral position. The reversing handle could not be moved without the controller handle was in the neutral position. Timothy Parkes, aged 20 years, the conductor, of two years' service, said the first time he noticed the driver was when he went to fetch his tea, which he took into the cabin. The driver did not tell him he was leaving the car. He did not see the front door closed, nor the motorman come through the car. It was for the conductor to decide that the car should start, and at 5.21 he released the brake. Instead of ringing the hand-bell he rang the foot-bell, thinking the driver was on the car. He knew he ought not to have started till he received the answering signal from the motorman. He had a book of rules, but had not read them. He denied that there was any by-play with the bells between the conductors of the several cars. Mr. G. A. Woolley, Wednesbury, resident engineer to the Birmingham and Midland Tramways Company, gave evidence that the foot emergency brake could be operated without current from overhead, there being connection with the motors. If the current had been left on, the hand-brake would not have held it. After the accident the reversing handle was missing, but the shock might have shaken it off the neutral position. It could not have fallen off if put in any other position. The jury returned a verdict that death was due to the overturning of the car, caused by the gross carelessness of the conductor, and that the driver was also deserving of censure. The Coroner said that as the jury had used the words "gross carelessness" (which were repeated after they had retired a second time), he had no option but to commit the conductor to Worcester Assizes. The accused was subsequently charged with manslaughter at the police court, and remanded until February 9.

THE BURY CAR FATALITY.

A verdict of accidental death, and exonerating the motorman from all blame, was returned at an inquest held on February 1, in connection with the death of a passenger from injuries received in the running away of a Bury Corporation car down New Road, Radcliffe, on January 3. The motorman described the rail as treacherous.

PRECAUTIONS AGAINST AIRCRAFT RAIDS.

The Home Secretary on February 8 issued an Order extending the reduced lighting regulations as follows on and after February 16:

In the portions of the Counties of Northumberland and Durham to which the Lights (East Coast) Order does not apply, and in the administrative County of the Soke of Peterborough.—From half an hour after sunset till half an hour before sunrise.

In the portion of the North Riding of Yorkshire to which the Lights (East Coast) Order does not apply in the West Riding of Yorkshire, and in the Counties of Derby, Nottingham, Leicester, Rutland, Northampton, excepting the Soke of Peterborough and Buckingham.—From one hour after sunset till half an hour before sunrise.

In the Counties of Lancashire, Cheshire, Flint, Stafford, Warwick, Worcester, Shropshire, Hereford, Oxford, Berkshire, Gloucester, Wilts, and Dorset.—From one hour and a half after sunset till half an hour before sunrise.

The Order revokes, as from February 16, all previous Orders as to lights applying to places to which this Order applies, except the Light (West Coast) Order, and the Lights (Vehicles) Order of December 15, 1915.

This Order may be cited as the Lights (Central Area) Order of February 8, 1916. The following are among its provisions:—

5. The intensity of the lighting of railway stations, sidings, goods yards, arches, etc., must be reduced to the minimum that will suffice for the safe and expeditious progress of works; the tops and sides of all external lights which cannot be dispensed with must be shaded or painted over.

6. Passengers in railway carriages which are provided with blinds must keep the blinds lowered, so as to cover the windows. The blinds may be lifted in case of necessity when the train is at a standstill at a station, but if lifted they must be lowered again before the train starts.

7. The lights of tramcars and omnibuses must be reduced if the chief officer of police so requires.

8. In case of sudden emergency, all instructions as to the further reduction or extension of lights given by, or under the direction of a competent naval or military authority, or the chief officer of police shall be immediately obeyed.

On the ground that places that had not restricted their lighting suffered in the last raid, Carlisle Council have voluntarily decided to adopt restrictions, and Barnsley Council have asked for that town to be included in the Order

In the Potteries, the police have arranged to notify the presence of the raiders by entirely suspending the tramway service, if it is considered inadvisable to use the "buzzers."

MISCELLANEOUS NEWS AND NOTES.

Shepherd's Parging Block Company, Ltd., have now supplied their block parging to more than forty tramways, and it is, we understand, giving very satisfactory results.

The Need for Non-Skid Rubber Tires.—While a motor omnibus belonging to the Northern General Transport Company was passing through Chester-le-Street, on the night of Febuary 5, it skidded from the left to the right side of the road and across a very broad footpath. A soldier and a woman who were standing on the path sustained injuries to their legs.

Thermit Rail Welding.—We understand that eight patents of Thermit, Limited, relating to rail welding have been suspended in favour of the British Thermit Company, Ltd., Liverpool, to whom a licence is about to be granted under a royalty for the use of these patents in carrying out work themselves. This decision, we believe, in no wise affects the position of Thermit, Limited, who remain owners of the patents, and will be able to supply the material or carry out the work in the same way as hitherto.

New Wood-Milne Tire Depots.—Messrs. Wood-Milne, Ltd., have opened depots at 21, Albion Street, Gaythorn, Manchester, and 94, Albion Street, Leeds. Both these depots are provided with facilities for fitting solid tires. We learn that the demand for the Wood-Milne patent foot-pump has greatly increased. As a large number of the cars going to the front carry one of these pumps as part of their equipment, the increase in the demand is not surprising.

New Employees and Peculations.—Charges of embezzlement were heard at West Ham police court against two conductors. On behalf of the prosecution it was stated that since the war a large number of temporary men had been employed on the West Ham cars, and peculations of small fares had been prevalent. One defendant was watched, and was seen to collect six halfpenny fares, for which he gave no tickets and failed to pay in the money. In the other case the sum of three halfpence was retained. Each man was bound over in £5 to be of good behaviour for twelve months.

A Device to Assist Motormen.—There is no doubt that the most effective way to render tramcars invisible to raiders is to shade the lights and to varnish the lamps, as is done in London and in many other places. In some localities, however, all the windows are fitted with blinds, which are kept drawn down. This method has the disadvantage of preventing a motorman from seeing the conductor's platform, a necessary precaution against accidents. To overcome the difficulty in Sunderland, Mr. A. R. Dayson, tramways manager and electrical engineer, has installed a step with a light spring on the rear platform, so that when passengers enter or depart the action of the step illuminates an electric bulb at the motorman's end.

Dublin Corporation Electricity Works.—Mr. P. W. d'Alton, consultant electrical engineer, has presented the report which he was asked to prepare on the Dublin Corporation electricity undertaking. He arrives at the following conclusions:—(1) Administration is unduly complicated; (2) charges for energy are unduly high for private supply, if not unreasonable for public lighting; (3) cost of the secretarial department is high; (4) system of coal supply needs careful overhauling; (5) charges for interest and repayment of moneys borrowed are fair and are being admirably met; (6) returns for units generated at the power-house are unreliable on account of the condition of the wattmeters; (7) Stewart engines used for steam generation are obsolete and extravagant; (8) the condensers are, and have been for a long time, ineffective. The report is likely to be strongly contested.

Employees' War Bonus and Wages.—After an all-night meeting Bradford tramways employes have accepted under protest the Tramways Committee's offer to increase their wages by 3s. and 2s. per week, instead of 5s. asked for by the union. The meeting also asked the Committee to give further consideration to the application. A resolution to suspend the 2½ per cent. deducted by consent from the men's wages for the Lord Mayor's war relief fund did not find a seconder. Birmingham Corporation have granted a weekly war addition of 2s. per week to the wages of their 7,075 employees. Keighley Council have refused the request of the tramwaymen for a war bonus of 3s. per week. Councillor A. Smith, chairman of the Tramways Committee, stated that the bonus could not be given unless the fares were doubled. Out of fifteen towns of whose tramways he had particulars, Keighley stood second in the matter of wages. The expenses had gone up £1,000 during the year. Colchester Council have granted allowances of 1s. 6d. per week to each of the married men and single men with dependants of the outdoor and shed staffs.

PERSONAL.

Councillor J. M'Caughey, J.P., was on February 2 appointed chairman of Belfast Corporation Tramways Committee in succession to Alderman J. Tyrrell, J.P., Councillor J. Warwick succeeds Councillor J. A. Duff as vice-chairman.

Private J. O'Connor, of the Manchester Regiment, formerly employed in the Corporation Tramways department, has been awarded the D.C.M. for conspicuous bravery under heavy fire. The medal was affixed to his tunic by the Lord Mayor of Manchester.

Private R. E. Bullough, a son of Mr. R. C. Bullough, general manager, Colchester Corporation Tramways, has been promoted from the ranks and received a commission in the South Midland Division of the Royal Engineers. Lieutenant R. E. Bullough joined the ranks at the outbreak of war and was attached to the King's Liverpool Regiment. Mr. Bullough has now two sons—both civil engineers—who have commissions in the Royal Engineers.

Major Fred Coutts, 5th Black Watch, general manager and electrical engineer of Paisley Tramways Company, was recently awarded the Territorial Decoration. This is given, the regulation states, as "a reward for long and meritorious service to officers of proved capacity." The qualifying period is twenty years, and not twelve years, as in the case of the efficiency medal for non-commissioned officers and men. Major Coutts's total service in the Volunteer and Territorial Forces extends to thirty years.

Mr. Walter L. Green, manager of the paving department of Millar's Timber and Trading Company, Ltd., of Pinners' Hall, London, is now, we are pleased to say, recovering from the serious illness which has confined him to the house for some months past. His many friends amongst the Municipal engineers and surveyors will be glad to know that he hopes shortly to return to business; and he will be glad if they will take this announcement as an acknowledgment of their kind inquiries.

CONTRACTS AND ORDERS.

Barford & Perkins, Ltd., Peterborough, have received an order for the supply of a motor road roller to the War Department.

Glasgow Tramways Committee have accepted the tender of

Digitized by Google

Liverpool Electric Cable Co., and of Pirelli, Ltd., for V.I.R. cable, and that of the British Westinghouse Co., for commutators.

Ilford Council have placed contracts for various classes of coal for the electricity works at prices ranging from 13*s.* 6*d.* per ton for slack, and 24*s.* 9*d.* for Glyncoed through and through. For three trucks per week of West Cannock 2-in. nutty slack, over a period of one year, the price is 20*s.* 10*d.* per ton.

The General Electric Co., of China, Ltd., Shanghai, have for the sixth time been successful in securing the yearly contract for the supply of Osram traction-type lamps to the Shanghai Tramways. This contract was secured in face of competition from the suppliers of many other make of lamps.

Glasgow Corporation have been recommended by the Electricity Committee to accept the subjoined tenders:—British Westinghouse Co., Ltd., one 6,000-kw. turbo-alternator and condensing plant, at £25,622, for the Port Dundas station; Willans & Robinson, Ltd., one 6,000-kw. turbo-alternator and condensing plant (with Dick, Kerr alternator), at £25,480, for St. Andrew's Cross station.

Johannesburg Council have allotted the following contracts:—Supply and erection, complete on foundations, of two Babcock and Wilcox marine type water-tube boilers, with auxiliary plant, Reunert and Lenz, Ltd., £16,700; supply of cable, Telegraph Manufacturing Co., £2,130; supply of cable, Henley's (S.A.) Telegraph Works Co., £1,108.

Sheffield Electric Supply Committee have adopted tenders as appended:—Supply of a turbo-alternator, C. A. Parsons and Co., £37,625; supply of three boilers and accessories, Stirling Boiler Co., Ltd., £34,400; extension of condensing water service and constructing concrete discharge chamber at Neepsend power station, E. Taylor, Ltd., £3,560; levelling site for coal storage and laying steam crane track, J. E. Nadin, £3,802; supply and delivery of six-panel, ironclad, h.t., two-phase switchboard for Forncett Street sub-station, A Reyrolle and Co., Ltd., £645 11*s.*

FINANCIAL REPORTS AND MEETINGS.

Montreal Tramways Company.—The board announce a quarterly dividend of 2½ per cent.

Chatham and District Light Railways.—This company are paying a dividend of 5 per cent. for the year on preference capital and 6 per cent. on ordinary capital. The revenue shows an increase of £9,865; expenses have also heavily increased.

Lanarkshire Tramways Company.—Out of an available balance of £20,971 the directors recommend a dividend at the rate of 6 per cent. per annum for the half year on the issued share capital, absorbing £10,200. An interim dividend at the rate of 5½ per cent. per annum has been paid for the June half-year, taking £9,432. Revenue shows an increase of £6,806, and expenses £1,896.

L.C.C. Tramway Receipts.—The tramway receipts from April 1, 1915, to January 26, 1916, were £1,908,553, as against £1,909,207 for the corresponding period of last year, a decrease of £654. For the two weeks ended January 26, the number of passengers was 21,559,920, an increase of 622,147 over the corresponding period of 1915, while the receipts were £90,933, an increase of £2,970. The route mileage worked was 141·67 miles.

Sunderland District Tramways Company.—After providing for interest on the prior lien bonds and the first mortgage debentures, and for sinking fund instalment, and making provision for depreciation on investments, the net profit for 1916 was £1,758 19*s.* To this must be added £644 brought forward, making £2,403, and it is proposed to recommend the payment of interest at the rate of 2½ per cent. per annum (less income tax) on the first income bonds, which will absorb £1,751 17*s.*, leaving £651 to be carried forward. The traffic receipts show a decrease of £522. On the other hand, various economies in the working expenses have been effected, leaving an increase in the profit of £580.

Tyneside Tramways & Tramroads Co.—Out of an available balance of £5,424 from the past year's trading the directors propose to pay a dividend on the preference shares at the rate of 5 per cent. per annum, less income tax (£601), and a dividend on the ordinary shares at the rate of 3 per cent. per annum, less income tax (£2,008 10*s.*). They are placing £1,400 to the credit of reserve for renewals, depreciation, and other contingencies (which, with £405 13*s.* interest on investments, will increase the fund to £22,562), and to the credit of special reserve account to meet contingencies £500. To provide for loss on conversion of Consols into War Loan, £288 19*s.* is allotted, leaving to be carried forward to next half-year, £525. The dividend paid on the ordinary shares for the whole year is at the same rate as that for the year 1914. The traffic receipts show a decrease of £621 1*s.* as compared with the corresponding half-year of 1914, and for the whole year there is a decrease of £1,042 10*s.*

Edinburgh Tramways Company. Mr. B. Hall Blyth, who presided at the annual meeting on February 4, said it had been found that 5,000 of the 13,000 pulleys on the system were wanting or inefficient. Everything was being done by Mr. Cox, the new engineer, to overhaul the whole machinery before the end of March, and put the undertaking in as good a condition as ever it had been. A great many delays had taken place, and the late engineer accounted for them as being due to the new drivers, but, to a large extent, it was due to inefficient inspection and to lack of repairs. The company had been subjected to some abuse for increasing the fares, but with the large addition to the cost of working they were bound to consider the interests of the shareholders. He was in hopes of a satisfactory result to the negotiations for the Corporation to take over the undertaking. The report, which appeared in our issue dated January 29, was adopted. Replying to a question the chairman said that since the appointment of the women conductors, the collection of the fares had been better than before. The Chairman also mentioned that although Mr. Shepherd's health had caused him to resign the post of general manager, the directors were glad to retain his services as secretary.

Dublin United Tramways Company.—The annual meeting was held on February 8, Mr. W. M. Murphy presiding. The report recommended a dividend at the rate of 6 per cent. per annum, less income tax, on the preference shares for the half-year ended December 31; a final dividend at the rate of 5 per cent. per annum, less income tax, on the ordinary shares for the half-year; and that £18,000 be set aside towards renewal of rails, and £5,000 to reserve and renewals. The carry forward is £13,045. In moving the adoption of the report, the chairman said the late Mr. Tresilian, their secretary, was forty years in the tramway service of Dublin, being associated with him in the amalgamation of the various companies and the electrification in 1896. Dealing with the balance sheet, the chairman said there was an item of £332 for new wagons to work the growing goods traffic, which showed an increase of £323. This was earned at an additional cost of £83. The gross receipts, the largest yet recorded, were £333,899, against £321,896. Of this increase, £11,677 was due to passenger traffic. The parcel traffic continued to grow, the increase being £337. The gross expenses exceeded those of 1914 by £18,143, which included war allowances amounting to £4,536. Gratifying as was the growth of the receipts the increase in expenses was greater by £6,140. In the cost of "Operation" there was an increase of £4,161. The average cost of about 24,000 tons of coal consumed was 3*s.* a ton higher, being 18*s.* 5*d.* They had contracted for enough coal to carry them through this year, but at a higher price. The greatest increase came under that of "Maintenance," and amounted to £10,154. Of this nearly £6,000 was incurred on road and track maintenance, and £2,700 represented new car motors and electrical car equipment. The chairman expressed regret that at this time of national crisis the Corporation were altering the levels of some of the roadways, thus necessitating the relaying of certain tramways at a cost of £1,727. During the year the board expended £16,214 on renewals of rails, reducing the reserve for this purpose to £24,275. The new rails were 105lb. to the yard, replacing 92lb. rails, and there were other improvements that should help to give renewed lines a longer life than the original ones. They had always provided out of the profits of one year a sum to meet renewals in the following and subsequent years. For January there was an increase of £2,000 in the receipts.

DIVIDENDS.

The following dividends were announced on Thursday:—

UNDERGROUND ELECTRIC RAILWAYS COMPANY.—The revenue enables the company to pay full interest to December 31 on its Six per Cent. First Cumulative Income Debenture stock and on its Six per Cent. Income Bonds and to carry forward about £38,500.

LONDON ELECTRIC RAILWAY.—Dividend on the Ordinary for the six months ended December 31 of ¾ per cent., making 1½ per cent. for the year against ⅝ per cent. for 1914, carrying forward £12,303, against £11,547.

CENTRAL LONDON RAILWAY.—Dividends: On the undivided Ordinary stock for the six months of 1½ per cent., making for the year 3 per cent. against 2⅝ per cent., giving on the Deferred 2 per cent. for the year against 1¼ per cent., carrying forward £15,685 against £15,413.

CITY AND SOUTH LONDON RAILWAY.—Dividend on the Five per Cent. Preference stocks for the six months ended December 31 of 2½ per cent., making 5 per cent. for the year. Last year no final dividend was paid on the 1901 and 1903 stocks.

LONDON GENERAL OMNIBUS COMPANY.—Dividend on the Ordinary shares for the six months ended December 31 of 6 per cent., making 12 per cent. for the year, with £198,747 placed to reserve and £23,237 carried forward.

METROPOLITAN DISTRICT RAILWAY.—Dividend on the Five per Cent. Second Preference stock for the six months ended December 31 of 1½ per cent., making 3 per cent. for the year, against 2 per cent., carrying forward £13,052, against £13,888.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended January 29, the latest period for which full returns are available, give total receipts of £177,144, or £24,145 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £77 5*s.* 9*d.* per mile of single track, and last year at the rate of £67 10*s.* 4*d.*, thus showing an increase for the week of £9 15*s.* 5*d.* per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Feb. 10.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	63	63½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	8 3/9	8 1/3
4%	4%	Do. 4% Deb. ...	100	91	71	71¼
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	75
5%	5%	Do. 5% Deb. ...	100	96	79½	80
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	19/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93	94¼
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅞	10	10 1/16xd
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98	98
$4	$4	Brazilian Trac. & Power Ord....	$100	66	50¾	51xd
$1½	$1½	Do. 6% Cum. Pref.	$100	97	90	89
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6½	6 9/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91½	90¾
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	34½	40
5%	5%	Do. 5% Cum. Pref.	100	103	57½	57½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85¾
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	99½	64¼	64¾
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75	75
70/-	70/-*	Do. 7% Pref.	100	55½	46	47
—	—	Do. 6% Pref. Ord.	100	17½	16	15
—	—	Do. Def. Ord.	100	11	9¾	10¾
5%	5%	Do. 5% Deb.	100	92	82½	82½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	69
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87	87
6/0	3/-	Calcutta Tramways, Ord. ...	5	7½	6 3/32	6
1/3	1/3	City of B.A. Trams.	5	5½	92/6	91/6
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85	84
6/-	6/-	Dublin United Trys 6% Pref.	10	—	xd	—
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	77½	77½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	2 8/9	2 8/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	9/15/6	9/15/6
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/32	2/-	2/-
6d.	6d.	Do. 5% Pref.	1	9/16	9/3xd	9/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	59	58½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	90½	90½
5%	5%	Do. 5% Inc. Deb.	100	88½	83¾xd	83¾
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	62	62
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	74½	74½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	79½	82½
$1½	$1½	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	45	45
6%	6%	Do. 6% Mt. Bds.	100	76	39½	39½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94½	94½xd
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½	94½
1/2*	1/2½*	National Steam Car	1	15/32	12/-	12/-
9½d.*	9½d.*	New General Traction	1	½	7/9	7/9
1/2½	6d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	67/6	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	86½	84xd
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/1½xd	10/1½
8d.	10d.	Provincial Trams. Ord.... ...	1	⅝	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	88	88
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75¼	75½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89	87½
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½xd
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78	77½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅞	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Increase or Dec.
Anglo-Argentine	Feb 4	£50,295	£49,591	5	£245,662	— £7,395
Auckland (28 days)	Dec. 17	20,414	1,804	24	125,840	+ 908
Ballarat and Bendigo ...	Nov. 7	3 835	3,586	32	25,097	— 2,670
Brazilian Traction Mlrs.	Dec.	6,010,490	6,527,000	52	77,113,110	+3,761,632
Brisbane	Jan.	29,620	32,280	4	32,280	+ 2,660
British Columbia $	Dec.	674,063	603,667	26	3,240,146	— 758,753
Buenos Aires Lacroze ...	Jan. 7	43,301	40,596	30	291,525	— 4,741
Burmah Tramway ... Rs.	Feb. 5	3,525	3,512	...	95,855	— 6,791
Calcutta Rs.	„ 5	64,894	68,107	5	352,476	+ 20,748
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias..	Jan.	904	2,841	4	2,841	+ 1,937
Cordoba	Dec.	12,091	13,025	34	124,148	+ 4,718
East India	Jan.	1,914	2,015	26	12,531	+ 650
Hong Kong $	Jan. 8	9,873	10,554	5	21 617	+ 1,483
Kalgoorlie	Nov.	2,414	2,611	48	30,402	+ 1,483
La Plata	Jan.	4,540	4,533	4	4,533	— 7
Lima	Dec.	32,411	34,685	52	385,854	— 7,338
Lisbon Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks) Rs.	Jan. 31	28,951	32,126	2	66,383	+ 8,997
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Sept.	...	61,211	...	...	...
Mexico $	*	...	...	...	...	...
Montevideo	Jan.	32,459	34,252	13	93,964	+ 5,818
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	74
Shanghai $	Jan. 12	22,371	26,019	...	...	...
Singapore $	Jan. 1	9,506	11,142	...	603,754	+ 19,299
Toronto $	Nov.	824,634	851,113	48	8,793,719	— 502,658
Winnipeg	Dec.	368,400	377,121	26	3,499,741	— 601,561

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1914-15	Latest Return. 1915-16	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1915-16	Incr. or Dec.
Aberdeen Corporation...	Feb. 2	£1,509	£1,682	+ £173	35	£63,622	+ £4,187
Accrington Corp.	Dec. 29	555	617	+ 62	39	21,750	+ 607
Ayr Corporation	Feb. 5	228	265	+ 37	38	14,386	+ 967
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 6	1 206	1,389	+ 183	44½	61 711	+ 5,546
Birmingham Corp.	„ 5	12,266	15 352	+ 3,086	45	644,732	+ 98,746
Blackburn Corp.	„ 2	964	1 091	+ 127	44⅔	56,377	+ 83
Blackpool & Fleetwood.	„ 5	346	370	+ 24	5	1,727	+ 135
Blackpool Corp.	„ 3	833	1,090	+ 257	45	73,188	+ 2,653
Bolton Corporation	„ 6	2 493	2,575	+ 82	45	120,554	— 533
Bournemouth Corp.	„ 9	1,685	1,886	+ 201	45	95,303	+ 5,247
Bradford Corporation	„ 5	5,553	6,215	+ 662	45	288,489	+ 12,626
Brighton Corporation	„ 6	786	882	+ 96	44⅔	49,405	+ 955
Bristol	„ 4	8,436	9,403	+ 967	5	47,258	+ 4,872
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	„ 5	1,418	1,659	+ 241	45	72,054	+ 2,781
Burton-on-Trent Corp.	„ 6	265	273	+ 8	45	12,799	— 288
Bury Corporation	„ 6	1,172	1,232	+ 60	45⅓	60,297	+ 342
Cardiff Corporation	Jan. 29	2,304	2,715	+ 411	43	118,034	— 1,004
Chatham & District	Feb. 3	946	1,033	+ 87	5	5,203	+ 513
Chesterfield Corp.	„ 3	236	249	+ 13	44	11,962	+ 124
Colne Corporation	Jan. 29	201	244	+ 43	...	...	...
Cork Electric	Feb. 3	420	472	+ 52	5	2,265	+ 131
Croydon Corporation	Jan. 21	1,431	1,665	+ 234	42	77,738	+ 4,966
Derby Corporation	Feb. 5	903	1,062	+ 159	44⅓	47,021	+ 2,187
Dover Corporation	„ 5	244	254	+ 10	44	13,734	+ 2,297
Dublin & Lucan	„ 4	118	128	+ 10	5	586	+ 5
Dublin United	„ 4	5,621	5,912	+ 291	5	30,061	+ 2,172
Dundee City	„ 2	1,179	1,339	+ 160	37⅔	51,444	+ 3,058
East Ham Corporation	„ 5	1,248	1,172	— 76	44⅔	58,018	+ 5,806
Exeter Corporation	„ 4	204	328	+ 34	44	16,658	+ 959
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	„ 5	20,021	22,634	+ 2,613	36	781,826	+ 59,289
Glasgow Subway	„ 5	1,079	1,251	+ 172	5	6,417	+ 765
Glossop (U. Elec. Supp.)	„ 5	105	134	+ 29	6	810	+ 170
Halifax Corporation	„ 1	1,897	2,093	+ 196	43⅔	97,321	+ 1,084
Hastings & District	„ 8	664	728	+ 64	5	3,783	+ 328
Huddersfield Corp.	„ 5	2,227	2,645	+ 418	4½	119,017	+ 16,246
Hull Corporation	„ 5	2,966	3,094	+ 128	44	137,841	— 1,118
Ilford U.D.C.	„ 4	562	605	+ 43	44	28,833	+ 3,258
Ilkeston Corporation	„ 9	111	145	+ 34	45	6,081	+ 366
Ipswich Corporation	„ 5	298	449	+ 151	43	24,196	+ 4,220
Isle of Thanet	„ 5	238	224	— 14	18	4,695	— 957
Kilmarnock Corp.	„ 5	147	165	+ 18	38	6,426	+ 264
Lanarkshire	„ 3	1,648	2,170	+ 522	5	10,811	+ 1,762
Lancashire United	„ 2	1,459	1,616	+ 157	5	7,830	+ 632
Leeds City	„ 5	7,925	8,957	+ 1,032	45	400,362	+ 32,249
Leicester Corporation	„ 5	2,747	3,072	+ 325	5	16,592	+ 2,178
Leith Corporation	„ 5	639	763	+ 124	38	20,366	+ 2,337
Leyton U.D.C.	„ 3	1,533	1,454	— 79	44	71,064	+ 9,310
Liverpool Corporation	„ 5	12,639	13,388	+ 699	5	70,521	+ 5,975
Llandudno & Colwyn B.	„ 4	175	190	+ 15	9½	1,765	+ 131
London County Council	Jan. 26	41,714	45,591	+ 3,877	43	1,908,553	— 654
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	Feb. 5	131	117	— 14	17½	2,363	— 777
Maidstone Corporation..	„ 3	152	180	+ 28	44	9,613	+ 461
Manchester Corp.	„ 5	16,428	17,153	+ 725	44	795,447	+ 29,015
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	„ 5	141	183	+ 42	44½	8,708	+ 566
N'castle-on-Tyne Corp.	„ 5	5,621	5,957	+ 336	45	276,740	+ 28,673
Newport (Mon.) Corp.	„ 5	721	848	+ 127	45	37,731	+ 1,579
New St. Helens & Dist.	„ 2	846	903	+ 57	31	31,976	+ 3,285
Northampton Corp.	„ 4	603	678	+ 75	44⅔	32,188	+ 5,595
Nottingham Corp.	„ 3	3,220	3,565	+ 345	44	165,183	+ 12,913
Oldham Corporation	„ 6	2,001	2,148	+ 147	46	104,400	+ 5,338
Portsmouth Corp.	„ 5	2,083	2,182	+ 99	45	110,302	...
Preston Corporation	„ 2	827	992	+ 165	44	43,193	+ 2,491
Provincial	„ 5	1,816	1,990	+ 174	18½	37,808	+ 2,879
Reading Corporation	„ 3	643	736	+ 93	44⅓	35,124	+ 3,840
Rhondda Tramways	Jan. 27	1,078	1,222	+ 144	4	4,606	+ 372
Rochdale Corporation...	Feb. 5	1,404	1,597	+ 193	42½	75,992	+ 4,174
Rotherham Corp.	„ 9	921	1,215	+ 294	45	53,406	+ 7,334
Salford Corporation	„ 7	4,582	4,934	+ 352	43⅔	232,806	+ 10,802
Sheffield Corporation.	„ 6	7,844	9,442	+ 1 598	45⅔	411,939	+ 57,992
Southampton Corp.	„ 2	1,160	1,389	+ 229	44	66,460	+ 7,896
Southend-on-Sea Corp...	„ 2	560	574	+ 14	44	35 611	— 7,919
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	Jan. 29	638	756	+ 118	43⅔	34,623	+ 1,620
Sunderland Corp.	Feb. 6	1,297	1,481	+ 184	45	67,605	+ 2,034
Sunderland District...	„ 2	468	565	+ 97	14	7,963	+ 752
Swindon Corporation	„ 2	152	183	+ 31	44	8,728	+ 808
Torquay Tramways	Jan. 27	360	434	+ 74	4	1,695	+ 167
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	Feb. 2	498	524	+ 26	5	2,395	— 8
Wallasey Corporation	„ 5	1,049	1,141	+ 92	44⅔	56,719	+ 1,383
Walsall Corporation	Jan. 29	637	834	+ 197	5	3,434	+ 572
Walthamstow U.D.C.	Feb. 5	724	765	+ 41	45	39,585	+ 3,771
Warrington Corp.	„ 3	414	486	+ 72	44	20,541	+ 1,279
West Ham Corporation	„ 3	2,729	2,979	+ 250	44½	136,897	+ 11,862
Wigan Corporation	„ 3	1,366	1,438	+ 72	44	67,113	+ 2,615
Wolverhampton Corp.	„ 9	980	1 105	+ 125	45	50,859	+ 3,287
Yorkshire (W. Riding)...	„ 6	1,524	1,555	+ 31	6	9,809	+ 1,247

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION

AND

MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,

AMBERLEY HOUSE, NORFOLK STREET, LONDON W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 10. | LONDON, SATURDAY, FEBRUARY 19, 1916. | [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

PONTYPRIDD URBAN DISTRICT COUNCIL.

ELECTRIC LIGHT AND TRAMWAYS DEPARTMENT.

STORES.

The above Council invite Tenders for the supply of the following Stores and Materials for the year ending March 31, 1917:—

1. Installation Stores and Sundries.
2. Joint Boxes and Service Cutouts.
3. Tramcar Equipment.
4. Tramways Overhead Equipment.
5. Glass and Globes.
6. Cables and Wires.
7. Insulating Material.
8. Meters.

Forms of Tender and Conditions may be obtained on application to the Electrical Engineer, Generating Station, Treforest, Pontypridd.

Tenders on the prescribed forms, sealed and endorsed "Tender for——" (as the case may be), must be received by the undersigned on or before Monday, March 13, 1916.

The Council do not bind themselves to accept the lowest or any Tender.

J. Colenso Jones,
Clerk to the Council.

Municipal Buildings, Pontypridd.
February 16, 1916.

THE URBAN DISTRICT COUNCIL OF ABERDARE.

STORES.

The Urban District Council of Aberdare are prepared to receive Tenders for the Supply and Delivery for one year, to March 31, 1917, of:—

(a) Cable, Meters, Joint Boxes, &c.
(b) Ironmongery, Stores, &c.
(c) Paints.
(d) Lubricating and other Oils.
(e) Glass.
(f) Electric Lamps.
(g) Uniforms.
(h) Tramway Tickets.

Tender Forms and Specifications may be obtained by manufacturers of and agents for the above materials on application to the undersigned. Every written application must be accompanied by a stamped addressed brief-sized envelope or no form will be sent.

Sealed Tenders, endorsed "Tender for——," and addressed to W. R. Morgan, Esq., Clerk to the Council, Town Hall, Aberdare, Glam., must be received on or before March 11, 1916.

The Council do not bind themselves to accept the lowest or any Tender.

A. J. Abraham, M.I.E.E.,
General Manager.

Electricity and Tramways Department,
Aberdare, Glam.

CITY OF NOTTINGHAM.

TRAMWAYS DEPARTMENT.

UNIFORM CLOTHING.

The Tramways Committee are prepared to receive Tenders for the Supply of various Articles of Clothing for the Motormen, Conductors, and Inspectors for the ensuing year.

Specifications and Forms of Tender may be obtained from Mr. John Aldworth, General Manager, Beastmarket Hill, where samples of various articles may be seen. All articles must be according to patterns. The cloth to be shrunk before being made up.

Sweating in any form will be disallowed in connection with the execution of the contract, and the contractor will be required to pay the local standard rate of wages to all workmen employed by him.

The Committee will not consider any Tender except those on the authorised form, which must be sent to the Chairman, Tramways Committee, Beastmarket Hill, Nottingham, in the official envelope provided, not later than Tuesday, February 29, accompanied with sample of cloth. A number or mark—not a name and price—to be fixed to each sample.

The Committee will not bind themselves to accept the lowest or any Tender.

W. J. Board,
Town Clerk.

Guildhall, Nottingham.
February 17, 1916.

PLYMOUTH CORPORATION.

CONVERTER.

The Plymouth Corporation is prepared to receive Tenders for Converter, with Starter, &c.

Copies of the Conditions, Specification, and Form of Tender may be obtained from the undersigned on the deposit of 20s. for each copy, which will be returned after receipt of a bona fide Tender upon the prescribed form and within the stated time. Should a Tender be withdrawn the deposit will not be refunded.

Sealed Tenders, endorsed "Contract No. 32," must be delivered to the undersigned not later than 12 noon, Thursday, March 2, 1916.

The Corporation does not bind itself to accept the lowest or any offer.

E. G. Okell,
Borough Electrical Engineer.

February 15, 1916.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

STEEL CARRIAGE BOGIES.

The directors are prepared to receive tenders for the supply of Twelve Pressed Steel Carriage Bogies.

Particulars may be obtained from the Secretary on payment of five shillings, which will be refunded on receipt of a bona fide tender.

Tenders should be delivered, under sealed cover, endorsed "Tender for Steel Carriage Bogies," to the undersigned, not later than 10 a.m. on Wednesday, March 1, 1916.

The directors do not bind themselves to accept the lowest or any tender.

T. Morrison,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
February 14, 1916.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

TO ELECTRICAL CONTRACTORS.

The directors are prepared to receive tenders for Electric Battery Materials for Carriage Lighting.

Copies of the Specification may be obtained from the Secretary.

Tenders should be delivered under sealed cover, endorsed "Tender for Train Lighting Material," to the undersigned not later than 10 a.m. on Wednesday, March 1, 1916.

The directors do not bind themselves to accept the lowest or any Tender.

T. Morrison,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
February 14, 1916.

Digitized by Google

CORPORATION OF DUBLIN.

TRAMWAY WAGON WHEELS.

The Corporation of Dublin invite tenders for the supply of Tramway Wheels (chilled steel).

Specification, with particulars, etc., can be obtained from the Town Clerk, City Hall, Dublin.

Tenders must be lodged in the Town Clerk's Office, City Hall, Dublin, on or before Monday, February 28, 1916.

HENRY CAMPBELL,
Town Clerk.

Town Clerk's Office,
City Hall, Dublin.
February 9, 1916.

COUNTY BOROUGH OF BIRKENHEAD.

BIRKENHEAD CORPORATION ELECTRICITY SUPPLY.

CONDUCTOR CABLE, ROTARY CONVERTERS, ETC.

The Corporation of Birkenhead invite tenders for the supply and laying of:—

Extra-high-tension Oval Split Conductor Cable,
Two Rotary Converters (one 300-kw., one 450-kw.) with Switchgear.

Copies of the Specifications, with Forms of Tender and General Conditions, can be obtained on application to the Borough Electrical Engineer, Mr. G. P. Shallcross, Corporation Electricity Works, Craven Street, Birkenhead on the payment of a fee of £1 1s. for each Specification, which will be returned on receipt by the Corporation of a bona-fide tender.

Tenders, which must be on the forms supplied, sealed and endorsed "Tender for Electric Cable" or "Tender for Rotary Converters and Switchgear," as the case may be, must be sent in to me not later than 9 a.m. on Monday, March 6, 1916.

Parties whose tenders may be accepted will be required to enter into a contract containing a clause as to the payment of the rate of wages and the observance of the hours of labour and conditions recognised and agreed upon between the Trades Unions and the employers in Birkenhead or in the locality in which the work for carrying out the contract is executed, as the case may be.

The Corporation do not bind themselves to accept the lowest or any tender.

(By order) J. FEARNLEY,
Town Clerk.

Town Hall, Birkenhead.
February 9, 1916.

SOUTH INDIAN RAILWAY COMPANY.

STEEL TYRES.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of Steel Tyres (900), for carriages and wagons.

Specification and form of tender may be obtained at the company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co., Ltd., marked "Tender for Steel Tyres" must be left at the offices of the company not later than one o'clock on Wednesday, February 23, 1916.

The company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 20s. for each copy of the specification.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the company, 3, Victoria Street, S.W.

91, York Street,
Westminster, S.W.
February 1, 1916.

TRAMWAY CARS FOR DISPOSAL.

Four Single-Deck Cars, mounted on Brush Maximum Traction Trucks. Bodies are constructed with closed compartments each end, and open with cross benches in centre. Seating capacity, 40 passengers (20 inside and 20 outside). Gauge, 4 ft. 8½ ins. Each car complete with 2 D.K. 25a motors, brush H.D. 2 controllers, ready for immediate service. Price, £350 each at Depot.—Apply, The MANAGER, Middleton Electric Traction Co., Hilton Fold Lane, Middleton, Lancs.

POSITIONS VACANT.

CAR-SHED FOREMAN.

Wanted immediately, experienced working Car-shed Foreman, ineligible for Army or Navy, with useful knowledge of overhead construction and repairs to same, so as to combine the duties of Shed Foreman and Overhead Linesman on a small system having 20 cars and about 4 miles of overhead line. Liberal wages and permanent situation for a suitable man.—Apply in first instance, Box No. 87, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

SWITCHBOARD ATTENDANT.

Switchboard Attendant required, D.C. three-wire central station experience essential. Wages 30s., rising to 35s. per week, plus 2s. war bonus, for seven eight-hour shifts.—Reply with testimonials to Borough Electrical Engineer, Craven Street, Birkenhead.

SUB-STATION ATTENDANTS.

Sub-Station Attendants of over military age, or who are otherwise ineligible for naval or military service, wanted temporarily to take the place of men serving with the Forces. Wages £2 per week of 56 hours, overtime at single rates, and in addition 3s. per week war bonus.—Apply with particulars of past experience, to General Manager, Electricity Offices, Dunning Street, Sunderland.

DRAUGHTSMAN.

Wanted, for temporary engagement, a draughtsman to prepare plans, etc., for the construction of an Electricity Generating Station. Applications, stating age, experience, salary required, and when at liberty, accompanied by copies of two recent testimonials, to be addressed to the Borough Electrical Engineer, Eccles Corporation Electricity Works, Cawdor Street, Patricroft, Lancs.

LINESMAN.

Linesman (Overhead), of non-military age (with knowledge of jointing and single core cables preferred, or man having some small knowledge and willing to be taught), required for South Coast tramways system. Motor driving taught.—Apply, stating full particulars and wages required, to Box No. 142, TRAMWAY AND RAILWAY WORLD.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons' Tramway Material.
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

ELECTRIFICATION ON THE NORFOLK AND WESTERN RAILWAY.
24 pp. and cover. 13½ in. by 9¾ in.
With Map, 7 Drawings and 20 Half-tone Illustrations.
Price 2/-
Reprinted from THE RAILWAY AND TRAMWAY WORLD.
One of the most complete and comprehensive electric railway articles that has come under our notice. Particulars are given of the Vivian-Bluefield equipment with single-phase transmission and three-phase motors.—*Electrical Industries.*
TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, FEBRUARY 19, 1916.

TRAILER CARS A NECESSITY.

To tramways authorities, especially where munition workers are the chief concern of the managers, a stock of trailer cars would be invaluable. Depleted as the ranks of the motormen are now, further losses will have to be faced on those sections that cannot be brought within the protection of the Munitions Act. The traffic of the Birmingham tramways has greatly increased since the war, and the manager and staff have been notably successful in coping with the strain placed upon them. Readers will have noted the regular increases in receipts recorded in our columns from week to week. For the forty-five weeks of the current financial year the total increase is no less than £102,000, much greater than that of any other tramway system in the country. Naturally, the undertaking is suffering from a shortage of drivers, and as the number of passengers is bound to increase concurrently with the carrying out of the policy of further diluting male labour with that of women, the difficulties of dealing with the traffic must also increase. Two years ago the Tramways Committee, acting on the advice of the general manager, Mr. Alfred Baker, increased the tramway facilities by acquiring the local motor omnibus fleet of forty vehicles. In order to enlarge the facilities, Mr. Baker is considering the provision of trailers, and on behalf of his committee he is making inquiries as to their working on the London County Council's tramways. We can best indicate the success of the system by affirming that one of the greatest improvements effected by Mr. Fell as the chief officer of London's tramways, will be the trailers. Without them it would have been impossible to maintain the excellent service that has been kept up during the past year on the Tooting section, where the heaviest traffic has to be carried. Mr. Fell's success has been achieved in spite of the bitter opposition of the police, who five years ago induced the Board of Trade to cancel the permission given for experimental working on the Euston-Hampstead route. In our issues of February 8, April 4, and May 9, 1912, we published letters from the managers of the principal tramways in Europe and America, setting forth the advantages of trail cars. In the same year the London County Council received the sanction of Parliament to their proposals, although the police opposed the scheme. Experiments were resumed on the outer section of the Woolwich line, and two years ago a service was instituted on the Embankment and Tooting route, where a score or more of trailers are in use. These cars provide accommodation for eighteen inside and thirty outside passengers, and they are the only double-deck cars lacking top covers. Their utility is attested by the fact that at busy periods the vehicles are crowded, no matter what may be the state of the weather. The motor cars and trailers are not worked on a circular route, as may be the case shortly when the additional trailers now being delivered are placed on the Embankment-Streatham-Tooting route. Yet no obstruction is caused when the trailers are shunted at the Merton terminus, where, if the war had not intervened, they would no doubt have been running over the London United metals to Wimbledon at the rush periods and to Hampton Court during the summer, for pleasure traffic. Early in 1914 an order for 150 trailers was placed, the design and coupling being described and illustrated in our issue of October 14 last, after the vehicles had been thoroughly tested in service. It is probably a matter of regret to managers in all large towns that they have not followed the example of London. Only York Council can claim the distinction of having done so. In order to relieve congestion, the Tramways Committee, on the advice of Mr. Hame, the general manager, and of Alderman Meyer, their chairman, obtained trailer powers. The cars have been delivered, and will be placed in service as soon as alterations have been effected at the termini.

MOTOR VEHICLES ON TRAMWAY TRACKS.

In connection with the holding up of tramway services at Manchester owing to the breakdown of motor wagons, Mr. J. M. McElroy, general manager of the Corporation Tramways, has stated that almost every day there is a block on the lines, and the department had to send breakdown gangs to clear the track. Mr. McElroy continued:—"If drivers of motor lorries would keep to their proper side of the road, the effect would not be so serious. On some roads the drivers prefer the centre because of the camber at the side, but perhaps another reason is that the centre of the road, for which the Department is responsible, is kept in a better state of repair. But whatever the reason, there ought to be a by-law to regulate this rapidly expanding traffic, so as to avoid these frequent dislocations."

Many thousands of tons of material have been carried through Northfleet to Chatham and the coast for naval and military purposes by means of motor vehicles since the outbreak of the war. This fact has been pointed out to Northfleet Council by Mr. J. R. Groves, manager of the Gravesend and Northfleet Electric Tramways Company in reply to a request for the execution of track repairs. Mr. Groves added that the lorries were generally driven on the tramway track because it was the best part of the road, for it was largely in regard to the effects upon the track of this special traffic that the Council were now harassing the company. Six men were working on the track in Northfleet, and all efforts to obtain more labour had failed. The company would not have been in so much difficulty in the matter of labour had they not encouraged their men to join H.M. Forces. Subsequently Mr. Groves met the Council in Committee, and an understanding was arrived at.

COMMENDABLE FRENCH EXAMPLE.

In the course of a report prepared by trade union officials who have visited France, in order to ascertain the causes that have contributed to the enormous increase in French munitions, it is stated, among other things, that in most cases the women work the same hours as the men, but where tramway journeys are undertaken the women start usually fifteen minutes later and leave fifteen minutes earlier than the men to avoid congestion on the tramcars.

An unwelcome British contrast to the foregoing procedure is revealed in a report on the employment of women, issued on February 11 by the Health of Munition Workers' Committee. The Committee state that if the home is to be preserved greatly improved conditions of transit and housing must be secured. It is far from uncommon to find two or three hours spent on the journey each way, generally in an overcrowded train or tramcar, and often with a severe struggle before even standing room can be obtained. The superintendent of a factory stated that the women constantly

Digitized by Google

arrive with their clothes torn in the struggle for a car, the satchel in which they bring their tea being sometimes torn away. The workers were of an exceptionally refined type, to whom such rough handling would be altogether unfamiliar. Tribute is constantly paid by foremen and managers to a similar spirit; they tell of workers readily working overtime in the knowledge that their action means the loss of the last car and a four or five mile walk at midnight.

Names of towns are not given in the report, but by co-operation between factory owners and transit authorities it should not be impossible to profit by the French example. In London a few years ago, the County Council obtained powers enabling them to run cars reserved for women, and to prosecute any male passenger attempting to invade a car so set apart. Such a car was run on the Tooting line for the benefit of girls employed at the Smithfield Markets.

MAINTENANCE OF SERVICES

Gradual curtailments are being made in the Salford services owing to a shortage of drivers. Further difficulty is anticipated when various groups are called to the colours.

While the help of voluntary drivers is much appreciated at Portsmouth, Councillor J. Timpson, chairman of the Tramways Committee, has stated that the manager does not allow their kind offices to interfere with paid men being taken on.

With the support of Barrow Council the local Tramway Company have written to the Minister of Munitions in reference to the necessity of maintaining an efficient tramway service for persons employed on war munitions.

Reporting to Dundee Tramways Committee that many conductors were put on the cars untrained, Mr. P. Fisher, the general manager, appealed to the public to help them as far as possible. Fares had been missed, but the undertaking was averaging over £100 a week more in receipts. A great number of the men were wounded soldiers.

Replying to a request for increased car services for colliers and mill girls, the manager of the South Lancashire Tramways Company has stated that by engaging women the company had got over the shortage of conductors, and now the shortage affected the motormen only. The company did not receive the slightest consideration from either workmen or employers, and colliery and mill proprietors took their drivers away without giving them the opportunity to fill their places, one mill having just taken four of their drivers in a fortnight. This was one instance among many.

In reporting on the alternatives if more motormen are called up to the Army, or if the present car service is deemed inadequate, Mr. W. T. Robson, the Southampton general manager, has expressed his preference for volunteer drivers night and morning rather than women drivers.

Complaint of inadequate tramway service from the east to west of Bootle was made at the February meeting of the Town Council. Alderman Smith remarked that at the time the motor omnibuses were considered, it was the intention to deal with the districts running from east to west, but the proposal had been allowed to drop. The railway service from Balliol Road Station was also inadequate, and people for the Waterloo or Seaforth direction had either to go into Liverpool for a car or walk.

While having made arrangements, in conjunction with Manchester Corporation Tramways for additional workmen's cars between Ashton and Manchester, Mr. E. Holt, general manager, Ashton Corporation Tramways, has reminded the local Trades Council that it is impossible to convey all workmen by the last available car to work, and the first available car from work. Mr. Holt has also pointed out that it is only by the loyalty of the car employees in working an excessive number of hours that the present service is being maintained.

Replying to complaints from Stockton Council, as to the tramways service, Mr. F. Freshwater, the manager of the company, has stated that out of a staff of 400, 198 had joined the colours and 23 fitters had left for munition work. The cars carried nearly 6,000 men engaged on munition work daily, and unless he can keep the existing staff Mr. Freshwater is doubtful whether he can continue to maintain the existing service. Mr. Freshwater believes he is the only manager in the north or in the south that has maintained the length of hours service or the number of cars running to the extent that he has. Many of the drivers had been knocked up owing to the strain upon them.

TRAMWAYS AND AIR RAIDS.

In the event of an enemy airship visit to England the headquarters of the home defence will communicate with the police in the provinces. At Birmingham the police will warn the public by sounding the steam whistles or sirens at certain factories. Instructions issued by the police state that all street lamps are then to be extinguished and lights in shops and houses should be put out. After the public warning has been given, all tramcars and omnibuses and all public or private conveyances must at once cease running, and should remain stationary until they are permitted to proceed by the police, and all lamps on such vehicles must be forthwith extinguished. It has been decided at Burton-on-Trent that if the sounding of the "buzzers" would be likely to reveal the whereabouts of the town to the raiders, the gas pressure shall be reduced and the electric light and tramway service stopped. Precautions on similar lines to those adopted for Birmingham have been planned at many other places.

Memorial to Fallen Tramway Heroes.—Birmingham Tramways Committee have undertaken to consider the question of taking steps to perpetuate the memory of the men of the Tramways Department who have fallen in battle.

EFFICIENCY MEETINGS.

The second of the efficiency meetings that are being held amongst the officials of the Operating Department of the Underground Railways and London General Omnibus Group took place at Electric Railway House, Westminster Broadway, Mr. H. E. Blain, Operating Manager, presiding over a representative attendance, which included, on the omnibus side, Mr. J. P. Thomas (General Superintendent), Mr. H. Lansdown (Assistant General Superintendent), and Captain A. Rozier (Superintendent of Employment); and on the Railway side, Mr. W. E. Blake (Superintendent of the Line), Mr. S. J. Webb (Railway Passenger Agent), and Mr. A. W. Agnew (Mechanical Engineer).

A paper on "A Parcels System on the Underground Railways" was read by Mr. H. J. Carter, chief parcels clerk to the Central London and City and South London Railway. The paper, which was illustrated with maps showing the areas covered by the parcels arrangements and charts depicting the results over a period of years, dealt chronologically with the parcels organisation since its commencement on the Central London Railway in July, 1911. Collecting, booking, accounting and delivery methods in operation were described and the advantages and difficulties carefully discussed. The discussion was of an exceedingly practical character, one of the speakers giving a tabulation of the results obtained in regard to time, cost, etc., in relation to parcels sent on the Underground Railways and by other methods.

At the third of these meetings, which are having an excellent effect in stimulating interest and considered criticism of the operating methods, a paper will be presented on the "Safety Movement."

ATTEMPTS TO ELUDE WOMEN CONDUCTORS.

Complaints have been made that at Glasgow and elsewhere systematic attempts have been made to avoid payment of fares to women conductors. In view of the shortage of inspectors, the managers might consider the desirability of publishing the following clause from the Tramways Act, 1870, which places the onus of payment on the passenger:—

> "If any person travelling or having travelled in any carriage on any tramway avoids or attempts to avoid payment of his fare, or if any person having paid his fare for a certain distance knowingly and wilfully proceeds in any such carriage beyond such distance and does not pay the additional fare for the additional distance, or attempts to avoid payment thereof, or if any person knowingly and wilfully refuses or neglects on arriving at the point to which he has paid his fare to quit such carriage, every such person shall for every such offence be liable to a penalty not exceeding 40s."

PROVINCIAL DEMAND FOR OMNIBUSES.

New licences have been granted to Barrow Tramways Company for running motor omnibuses.

Lanarkshire Tramways Company have ordered four additional omnibuses, which will be put into service in March.

Manchester Tramways Committee have received the sanction of the Treasury to borrow £5,000 for the purchase of omnibus chassis.

At the February meeting of Birmingham Corporation, Councillor Harrison Barrow, chairman of the Tramways Committee, said there was an enormous demand for the motor omnibuses that had been ordered, particularly for munition workers' transport. The vehicles could be obtained only if it were shown that they were required for munition workers, and it was quite impossible to supply the needs of the Quinton district. The Committee hoped, however, to be able very soon to construct the light railway to Quinton, the time for the construction of which had been extended.

COMPENSATION FOR TRAMWAY ACCIDENTS.

The Highways Committee of the London County Council have reported that they had settled 1,134 claims against the Council in respect of accidents arising in connection with the working of the tramways, the cost of these settlements having amounted to £10,004. In 35 other cases actions were brought against the Council. In 14 of these a verdict against the Council was given, and sums amounting to £634 and costs had to be paid. Of the remainder, three were subsequently withdrawn, and in 18 actions verdicts were given for the Council. A sum of £961 has been paid in settlement of claims made by the Council for damage to tramway property.

MISCELLANEOUS NEWS AND NOTES.

East Ham Tramways are deriving benefit from the recent increase of fares.

Argentine Railway Electrification.—The Argentine Central Railway is in course of being converted to electric working on the third rail system.

Car Covers.—A conference has been held between Nelson and Colne Tramways representatives to discuss the subject of providing top covers to all cars.

Free Rides for Belfast Wounded Soldiers.—The Tramways Committee have recommended that free travelling be granted on the cars to wounded soldiers.

Women as Tramcar Drivers.—Glasgow Trades Council have passed a resolution protesting against the employment of women as tramcar drivers.

Digitized by Google

The Track at Jarrow.—The Town Council have decided to call the attention of the Tramways Company to the condition of the permanent way.

New South Wales Railways and Tramways Department require tenders for a 2,500 kw. turbo-alternator. Specification, etc. may be seen at 73, Basinghall Street, E.C.

I.E.E. and Enemy Members.—The Institution of Electrical Engineers will meet on March 1 to consider a resolution under which subjects of enemy countries will cease to be members.

Dundee Renewals.—A statement being made at a meeting of Dundee Tramways Committee that there were frequent breakdowns of the overhead equipment, the general manager replied that a portion of the equipment required to be renewed.

Through Fares Between Accrington and Blackburn.—The respective Corporation Tramways Departments have arranged for the issue of through tickets between the two towns at the existing rates.

Cars Required for New Zealand.—Dunedin Council require by May 17, tenders for the supply and delivery of six complete electric tramcars and other sections of cars. Further information can be obtained at the Board of Trade Branch, 73, Basinghall St., E.C.

North-Western Electrification.—It is stated that the directors of the London and North-Western Railway hope shortly to complete the electrification of the North London Railway, from Richmond to Broad Street, adjoining Liverpool Street.

Electrical Extensions.—Applications for sanction to borrow loans for extensions at generating stations have been made by Salford Council (£13,600), Stafford Council (£12,000), Barrow Council (£10,000).

Scottish Capital's Licensing System.—Additional women conductors were recently granted licenses at Edinburgh Burgh Court. It was reported that they had all passed satisfactorily through the period of probation.

Controlled Establishments.—The Minister of Munitions has made an Order under Section IV. of the Munitions of War Act, declaring 116 additional establishments as controlled establishments under the Act as from February 14. A total of 2,834 establishments have now been declared as controlled.

Excess Profits Duty Appeals.—The Board of Referees (Finance (No. 2) Act, 1915) appointed to consider appeals and applications in respect of the Excess Profits Duty, under the chairmanship of Mr. H. E. Duke, K.C., M.P., have opened their offices at 133, Strand, W.C.

Belfast Turbo-Generator Mishap.—The Home Office, as the result of an investigation, have informed Belfast Corporation that the accident to a turbo-generator at the power station was due partly to the generator working at an excessive speed and partly to a defect in the casting.

Increased Fares at Leith.—The Tramways Committee have decided, in view of the serious increase in the working expenses, to recommend the Council to effect the following changes:—Abolition of halfpenny fares; workmen's fares in the middle of the day; and the concession to soldiers and sailors.

Committee on Coal Supply.—The Board of Trade have appointed, on the nomination of the various coalowners' associations, coal and coke supplies committees in the coal-producing districts, with the object of ensuring that munition firms and other important consumers obtain the supplies they need with as little delay and friction as possible.

Electrical Research.—The Council of the Institution of Electrical Engineers have been informed by the Committee of the Privy Council for scientific and industrial research that the following grants have been made to the Institution for one year's research, viz.:—Heating of buried cables, £840; properties of insulating oils, £250.

Damage Caused by Boys.—In prosecuting ten boys for hanging on to the backs of tramcars, Mr. G. E. Roddy, traffic manager to the Rhondda Tramways Company, informed the magistrates that the boys put the lifeguards out of gear, and it had cost some hundreds of pounds during the past few months to put them in repair. The boys had become venturesome owing to the presence of women conductors.

Railless Trolley Services in South Africa.—Installations of railless trolley cars are now working in Germiston and Boksburg and in Bloemfontein. Referring to the latter service, a South African contemporary observes that "trackless tramcars ensure perfect roadways as a matter of necessity. The switchback roadways of Bloemfontein will drive pedestrians into the cars, and should ensure the success of the venture at once."

Cost of the Wigan Breakdown.—Alderman Fletcher, chairman of the Tramways Committee, has informed the Council that the estimated loss of receipts on the cars owing to the recent failure of the power supply was £1,277, and after deducting £204 for power expenses and £116 for wages, the net loss was £956. The profit the cars had made had now been wiped out through a mishap over which the Tramways Committee had no control.

Liverpool-Manchester Transport Company.—Owing to the inadequate railway facilities available between the Liverpool Docks and the Manchester district, the cotton manufacturers have been greatly inconvenienced. To overcome the difficulty they have organised the Cotton Industries Motor Transport Company, Ltd., with offices at 4, Norfolk Street, Manchester, under the management of Mr. W. A. Cocking. It is proposed to garage a fleet of ninety vehicles in the horse tramway depot at Chorlton Road.

60,000 kw. Turbines.—It is reported that the General Electric Company, U.S.A., and the Westinghouse Electric and Manufacturing Company have submitted tenders and specifications to the Interborough Rapid Transit Company of New York for two 60,000 kw. steam turbine units. Each unit will be made up of three separate electric generators driven by one high pressure and two low pressure turbines, the latter being connected in multiple. If constructed, these will be the largest steam turbines that have yet been built.

Chicago Engineering Board.—The City Council of Chicago have approved the appointment of Messrs. Arnold, Ridgway, and Parsons as a board of engineers to inquire into and report on transit conditions in Chicago. It is estimated that the cost of doing the work entrusted to the engineers will be approximately £44,000, with £6,000 for each of the three engineers, and £26,000 for the engineering staff. It is not expected that the report will be ready to be submitted until the autumn.

Who is the Culprit?—The A.E.G. of Berlin, in advertising a rail grinding machine in a recent issue of the "Elektrische Kraftbetriebe," states that among other orders filled—it is referring, of course, to pre-war times—was one for four machines from London. It would be interesting to know exactly what were the reasons which led to the purchase of a German type of grinder, when very satisfactory machines for the same purpose could have been obtained from British manufacturers. Perhaps the culprit will explain.

B.E.F. Mutual Aid Fund.—No. 8 of the "Record," issued by the British Electrical Federation Mutual Aid Fund, gives an account of the operations to February 2. Mr. C. G. Tegetmeier, chairman of the Central Committee, reports that £14,610 has been subscribed by the various companies and their employees, while £11,910 has been paid to dependants of employees who have gone to the war. 1,650 men have enlisted out of a total of 7,432 employees. The "Record" contains a number of letters from men at the Front, all cheerful and confident.

Rebate to Barrow Tramways Company.—Barrow Council have decided to continue the agreement of June 15 last with the Tramways Company with reference to the Walney section, and that as from January 1, 1916, until the service to Biggar Bank (stopped by the military) can be resumed, the Corporation will allow the company a rebate at the rate of £400 per annum. The company will use their best endeavours to improve the service by providing additional cars and a more efficient inspection and regulation of traffic over the whole system.

Abandoned Automatic Machine Experiment.—In December, 1913, the London County Council accepted the recommendation of the Highways Committee that a contractor should be permitted to fix automatic machines for the sale of chocolate on the upper saloons of cars worked from Hammersmith car shed, upon payment at the rate of £2 10s. per car per year. The boxes were not provided until April 1, 1915, and at the expiration of the first six months the agreement was suspended in order that the result of the experiment might be considered. The contractor has intimated that he does not desire to proceed with the scheme.

Proposed Purchase of Aberdeen Suburban Tramways.—Aberdeen Corporation Tramways Committee have decided that it would be impossible at present to carry through the scheme for purchasing the undertaking of the Suburban Tramways Company. They recommended the Corporation to re-open the question after the war. Mr. J. Dalrymple, general manager, Glasgow Corporation Tramways, had made a valuation of the property, and it is understood that his estimate was £38,000, as against £45,000 asked by the company. Mr. Dalrymple advised that a better service could be provided if the tramways were all under Corporation control. The Corporation have endorsed the committee's decision.

Victorian Electrical Contracts.—The following tenders have been accepted by the Victorian Railway Commissioners:—Australia General Electric Co., electrical equipments for bogie cars on St Kilda—Brighton Electric Street Railway; British General Electric Co., electric lighting materials for Jolimont car repair shop; W. T. Henley's Telegraph Works Co., rubber-covered cable, £28 per mile; British Insulated & Helsby Cables, overhead line material for Sandringham to Black Rock electric street railway; J. Harvey, Shaw and Drake, air ducts and mouthpieces for turbo-alternators during period ending June 30, 1918; Australian General Electric Co., neutral track relays for electrical circuits, £4 6s. 6d. each.

Birmingham's Heavy Traffic.—The Corporation tramway traffic returns for the week ended Feb. 5, showed that 3,156,963 passengers were carried, against 2,938,094 in the corresponding week of 1915—an increase of 218,869. The increase in the previous week was even greater, being 348,933. The increase is almost entirely due to munition work. The early cars not only take workmen to the factories, but bring back those who have been on night shifts. In the evening the process is repeated. Up to Feb. 12, the receipts for the present year show an increase of £102,101. The new lighting restrictions were considered by the Tramways Committee on Feb. 14, when Mr. Alfred Baker, general manager, reported that so far no difficulties had been encountered. It was felt that as long as the number of late passengers remained as large as now there would be no justification for any restriction.

Glasgow Tramways Battalion in France.—Mr. J. Dalrymple, general manager, Glasgow Corporation Tramways, has received an account of how five deaths occurred in the 15th Highland Light Infantry, composed of tramway employees. His correspondent says: "One sergeant, one corporal, and three privates were killed by a rifle grenade. This got our fighting spirit up, and we are just itching to come to close quarters with the enemy. We send out working parties and patrols into No Man's Land almost every night, and exciting experiences often befall them. Some are laughable and others more serious. One time whilst out four of our men and one officer met a large working party of Germans, who numbered about thirty. With great presence of mind our officer, when ten yards from him, threw a bomb into their midst, killing one Hun officer and wounding at least two of their privates. Our casualties amounted to one private wounded."

Trafford Park Tramway Scheme.—An inquiry by the Light

Digitized by Google

Railway Commissioners, was held in Manchester, recently, into an application for sanction to construct three light railways in and adjoining the Park. The application was made by Mr. Marshall Stevens and a number of persons interested in the development of the locality, which already possesses an electric tramway worked by Manchester Corporation for the Trafford Park Company. The approximate length of the proposed railways was two, four and seven furlongs, and they were required for the conveyance of the increasing number of workmen employed in the locality, and of goods. Opposition was offered by the railway companies, Manchester Ship Canal Company, Lancashire County Council, Manchester Corporation, and Stretford Council. The ground of objection was that the railways were not in the public interest; it was also alleged that the promoters intended to give preference to commercial undertakings in the Park over those outside.

PERSONAL.

Corporal T. Fearing, of Bury Council electricity works, has been awarded the D.C.M. for brave conduct at the front.

Mr. H. H. A. Curtis has been appointed power station superintendent in the Tasmanian Government hydro-electric department.

Mr. H. R. Harper, Melbourne city electrical engineer, has had his salary increased from £1,000 to £1,250 per annum.

Chief Inspector Clarke, Lowestoft Corporation Tramways, who is one of the 27 employees serving in the Forces, is at present in England recovering from wounds.

Reg. Sergt.-Major B. Tripp, S. Lancashire Regiment, has received the Distinguished Conduct Medal. He enlisted from the Manchester works of the British Westinghouse Company.

Mr. H. W. Thornton, general manager, Great Eastern Railway, has accepted the invitation of the President of the Board of Trade to become a member of the Railway Executive Committee.

Privates Jolly and Eglington, two Doncaster tramcar conductors, have been awarded the Distinguished Conduct Medal. The Town Council have forwarded a resolution of congratulation to them.

Lance-Corporal B. J. Kenyon, a Wigan Corporation car conductor, has been given a Distinguished Conduct Medal for gallantry at Ypres, in May of last year.

Mr. G. T. Milne, H.M. Trade Commissioner for Australia, will be paying an official visit to England about the middle of March. Manufacturers and others desirous of interviewing him should apply to the Director, Commercial Intelligence Branch, Board of Trade, London, E.C.

Mr. J. B. Feltham, chief assistant at the generating works of the Gloucester Electricity and Light Railways Committee, was selected from among 130 applicants for the post of electrical engineer at Mexborough. Mr. Feltham had been at Gloucester for nearly fifteen years.

The Hon. Elaine Jenkins, who presided at the annual meeting of Swansea and Mumbles Railway Company, was described by Mr. R. Buckland as the only lady who has the distinction of being the chairman of a railway company in the United Kingdom. Replying to her re-election as a director, Miss Jenkins remarked that her father always took a special interest in that undertaking. At the meeting of Mumbles Railway and Pier Company, which was attended by the Hon. Mrs. Daniell and the Hon Miss Jenkins, the shareholders passed a resolution placing on record the high esteem and regard in which they held their late chairman, Lord Glantawe. Mrs. Daniell acknowledged the vote.

Mr. G. Marshall Harriss, general manager, Dublin United Tramways, was referred to at the company's annual meeting by Mr. Murphy, the chairman, who said that there could not be any higher tribute to the efficiency and organising capacity of the late Mr. Tresilian and Mr. Gordon than the fact that the directors were able to find amongst their subordinates men well trained to fill up every position. The directors had power to appoint a general manager, and to that position Mr. Harriss had been appointed. He had been their electrical engineer since 1911. In 1907 he was engineer to the International Exhibition, and as chairman of the Working Committee he (Mr. Murphy) had opportunities of appreciating his resourcefulness. Subsequently he asked Mr. Harriss to go to West Africa, where he was building a railway, but recalled him to take up the position of electrical engineer, vacant by the death of Mr. Sheardown. Mr. Harriss soon made good, and he was already justifying his appointment as general manager. It was a source of much gratification to the directors to be able to promote their staff. It could not fail to have a good effect on the service generally when men found that their promotion was not indefinitely postponed by the importation of outsiders to the higher positions.

Sergeant H. Neale, of the Norfolk Regiment, who was employed on the Bradford Corporation Tramways, has been killed in action in France.

CONTRACTS AND ORDERS.

Walsall Council have accepted the tender of Belliss & Morcom, Ltd., for the supply of a 3,750 kw. turbo-alternator, at £13,227.

Keighley Tramways Committee have purchased a second-hand petrol chassis for conversion into a tower wagon, at a cost of £180.

Derby Council have placed an order with the British Electric Transformer Company for the supply of a transformer.

The National Steam Car Company, Ltd., London, have received an order from Manchester Gas Committee for a three-ton coke-fired steam lorry chassis.

Tramway Tickets. Ten firms who had been invited to tender for the year's supply of tramway tickets for the Yarmouth tramways have declined, owing to prospective difficulties with regard to paper supplies.

Manchester Electricity Committee have placed the following contracts:—

B. Thomas, one low-tension switch-board; Johnson and Phillips, Ltd., low-tension cable; British Westinghouse Electric and Manufacturing Co., Ltd., four 1,050-1,320-kw. rotary converters for sub-stations; Bruce Peebles and Co., Ltd.; two 1,050 kw. motor converters and two 200 kw. positive traction boosters for sub-stations; Mirrlees Watson Co., Ltd., alterations and additions to condensing plants; Alton and Co., high and low-pressure steam and water pipework; J. Hopkinson and Co., Ltd., Huddersfield, valves; British Insulated and Helsby Cables, Ltd., cables.

Beneficial Latitude.—Alderman F. A. Dunsford, chairman of Southampton Tramways Committee, at the February meeting of the Council, stated that a short time ago the Committee were given sanction to purchase copper and rails, and they bought copper at £78, while it was now £122 per ton, £95 being obtained for the old metal. They also bought rails at £7 10s., which could not now be got under £14, and probably not at all. They had authorised the manager to purchase certain things, and he asked the Council to allow them a certain amount of latitude.

FINANCIAL REPORTS AND MEETINGS.

Glasgow Subway Railway Company.—The directors have declared a final dividend of one per cent. on the preference shares, making two per cent. for the year.

Scottish Motor Traction Company.—A dividend of 7½ per cent. free of tax, for the past year, has been declared, £2,119 being carried forward.

British Wagon Company and Excess Profits.—The net profits of the British Wagon Company for the past year were £62,618. A final dividend of 6 2-3 per cent. is proposed, making 13 1-3 per cent. for the twelve months, providing £1,000 for excess profits tax, transferring £5,000 to the reserve (making that fund £170,000), and carrying forward £5,452.

Liverpool Overhead Railway.—A final dividend of two per cent. on the ordinary shares, making three and one quarter per cent. for the past year, is announced. The ordinary shares received three per cent. for each of the years 1914 and 1913, two and one quarter per cent. for 1912 and one and a half per cent. for 1911.

Tyneside Tramways Company.—At the annual meeting on Feb. 8, Mr. T. Merz, the chairman, said it was gratifying that the ordinary traffic had increased by five per cent., although the holiday traffic fell off by a matter of £1,400. The increased expenditure was largely due to repairs and upkeep of the line. The reserve fund had been increased by £3,399, of which £2,600 had been taken out of revenue, and £799 was interest which had accrued on investments. They would have left for investment over £20,000. Last year they put £1,500 to a special fund in order to meet exceptional expenses, and they had added to it £500 this year. The meeting agreed to a dividend on preference shares at the rate of five per cent., and on ordinary shares at the rate of three per cent. The meeting empowered the directors to spend a sum not exceeding £200 for purposes of the war.

Sunderland District Electric Tramways.—Mr. H. R. Hogg, presiding at the annual meeting of this company, said that in the first three months of the war they lost £1,500 in receipts. For the past year the loss had only been £522. By a re-arrangement of what was not immediately necessary in their annual expenditure they had converted that loss into an excess of receipts of £580. The cars, buildings, overhead equipment and permanent way had been kept up to the mark, but they had had to pay a considerably increased price for rails and tires. They had also had to pay higher wages and increased rates and taxes. The number of passengers was 4,515,568, as against 4,710,679, a loss of about 200,000. The car mileage was slightly reduced and the ratio of costs to receipts came to 54.27 per cent., as against 56.84. The board would have liked to increase the number of cottages for the men's accommodation, but in view of the heavy cost of building at the present time they decided to postpone this during the war. The meeting agreed to a payment of interest at two and a half per cent. for the year on the first income bonds, carrying forward £651.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended February 5, the latest period for which full returns are available, give total receipts of £176,665, or £18,712 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £77 1s. 7d. per mile of single track, and last year at the rate of £69 14s. 1d., thus showing an increase for the week of £7 7s. 6d. per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Feb. 17.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	67½	63
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	81/10½	8 3/9
4%	4%	Do. 4% Deb. ...	100	91	71¾	71
4½%	4½%	Do. 4½% Deb. ..	100	98½	74	74
5%	5%	Do. 5% Deb. ...	100	96	79¼	79¼
7d	1/-	Auckland Elec. Trams. Ord. ..	1	1 5/32	19/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92¾	93
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅞	10	10
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98	98
5½	5½	Brazilian Trac. & Power Ord. ...	$100	66	52¾	50¾
$1½	$1½	Do. 6% Cum. Pref.	$100	97	90¾	90
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 11/16	6½
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	36	34½
5%	5%	Do. 5% Cum. Pref.	100	103	57½	57½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64¾	64¾
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75	75
70/-	70/-*	Do. 7% Pref.	100	55½	47½	46
—	—	Do. 6% Pref. Ord.	100	17½	16½	16
—	—	Do. Def. Ord.	100	11	9¾	9¾
5%	5%	Do. 5% Deb.	100	92	82½	82½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87	87
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6 5/32	6 5/32
1/3	1/3	City of B.A. Trams.	5	5½	92/6	92/6
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85	85
6/-	6/-	Dublin United Trys 6% Pref.	10	12	11 3/16	xd
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	77½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	¾	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	10 1/16	9/15/6
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/1½	2/-
6d.	6d.	Do. 5% Pref.	1	9/16	8/9	9/3xd
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	59	59
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	90½
5%	5%	Do. 5% Inc. Deb.	100	88½	83¾xd	83¾xd
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	62
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	75½	74½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78½	78½
$1¾	$1¾	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	42	45
6%	6%	Do. 6% Mt. Bds.	100	76	39½	39½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½	94½
1/2*	1/2½*	National Steam Car	1	15/32	12/-	12/-
9½d.*	9½d.*	New General Traction	1	½	7/9	7/9
1/2½	6d.	Northern Gen. Trans. Ord. ...	1	5/8	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4½	67/6	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	80½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	15/32	10/1½xd	10/1½xd
8d.	10d.	Provincial Trams. Ord.	1	⅝	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	89	88
5%	5%	1st. Mt. 5% 50 yr.	100	89½	73	75¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89	89
5%	5%	Do. 5% Perp. Deb.	100	99½	77¾	77½
—	—	Singapore Elec. Trams	5/-	¾	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78	78
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅞	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Increase or Dec.
Anglo-Argentine	Feb 11	£51,560	£50,263	6	£295,925	— £8,692
Auckland (28 days)	Jan. 14	22,164	22,868	28	148,708	+ 1,612
Ballarat and Bendigo ...	Dec. 5	3 498	3,397	36	28,494	— 2,771
Brazilian Traction Mlrs.	Dec.	6,010,490	6,527,000	52	77,113,110	+3,761,632
Brisbane	Jan.	29,620	32,280	4	32,280	+ 2,660
British Columbia $	Dec.	674,063	603,667	26	3,240,146	— 758,753
Buenos Aires Lacroze ...	Jan. 7	43,301	40,596	30	291,525	— 4,741
Burmah Tramway ... Rs.	Feb. 12	3,577	3,708	...	99,563	+ 6,922
Calcutta Rs.	„ 12	66,435	65,433	6	417,909	+ 19,746
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias..	Jan.	904	2,841	4	2,841	+ 1,937
Cordoba	Dec.	12,091	13,025	34	124,148	+ 4,718
East India	Jan.	1,914	2,015	26	12,531	+ 650
Hong Kong $	Jan. 15	9,334	10,982	6	32,599	+ 3,131
Kalgoorlie	Nov.	2,414	2,611	48	30,402	+ 1,483
La Plata	Jan.	4,540	4,533	4	4,533	— 7
Lima	Dec.	32,411	34,685	52	385,854	— 7,338
Lisbon Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks) Rs.	Feb. 15	27,430	29,860	6	96,243	+ 11,427
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Sept.	...	61,211	...	...	...
Mexico $	*	...	...	...	...	...
Montevideo	Jan.	32,459	34,252	13	93,964	+ 5,818
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai $	Jan. 19	23,380	27,019	...	...	...
Singapore $	Jan. 8	9,384	11,957	1	11,957	+ 2,573
Toronto $	Nov.	821,634	851,113	48	8,793,719	— 502,658
Winnipeg	Dec.	368,400	377,121	52	3,499,741	— 601,561

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1914-15	Latest Return. 1915-16	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1915-16	Incr. or Dec.
Aberdeen Corporation...	Feb. 9	£1 507	£1,688	+ £181	36	£65,311	+ £4,369
Accrington Corp.....	„ 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	„ 12	211	251	+ 40	46	14,638	+ 1,[illegible]10
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 13	1 139	1,360	+ 221	45½	63 071	+ 5,767
Birmingham Corp.	„ 12	11,922	15 277	+ 3,355	46	660,010	+ 102 101
Blackburn Corp.	„ 9	1,000	1 074	+ 74	45⅔	57,452	+ 161
Blackpool & Fleetwood.	„ 12	278	283	+ 5	6	2,010	+ 140
Blackpool Corp.	„ 10	596	743	+ 147	46	73,931	+ 2,789
Bolton Corporation.....	„ 12	2 426	2,648	+ 222	46	123,202	— 311
Bournemouth Corp.....	„ 16	1,680	1,907	+ 227	46	97,210	+ 5,474
Bradford Corporation ...	„ 12	5,981	6,046	+ 65	46	294,535	+ 12,691
Brighton Corporation ...	„ 13	766	888	+ 122	45	50,294	+ 1,077
Bristol	„ 11	7,980	9,165	+ 1,185	6	56,423	+ 6,056
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 12	1,390	1,590	+ 200	46	73,644	+ 2,981
Burton-on-Trent Corp...	„ 13	249	225	— 24	46	13,024	— 311
Bury Corporation.....	„ 13	1,103	1,235	+ 132	45½	61,532	+ 473
Cardiff Corporation.....	„ 12	2,404	2,613	+ 209	45	123,330	— 541
Chatham & District.....	„ 10	972	1,033	+ 61	6	6,236	+ 574
Chesterfield Corp.	„ 10	235	248	+ 13	45	12,210	+ 137
Colne Corporation	Jan. 29	201	244	+ 43	...	...	...
Cork Electric	Feb. 10	426	452	+ 26	6	2,717	+ 157
Croydon Corporation ...	Jan. 21	1,431	1,665	+ 234	42	77,738	+ 4,966
Derby Corporation	Feb. 12	875	954	+ 79	45½	47,976	+ 2,267
Dover Corporation	„ 12	238	244	+ 6	45	13,979	+ 2,303
Dublin & Lucan	„ 11	108	111	+ 3	6	696	+ 7
Dublin United	„ 11	5,422	5,599	+ 177	6	35,660	+ 2,354
Dundee City	„ 9	1,200	1,294	+ 94	38⅔	52,739	+ 3,153
East Ham Corporation	„ 12	1,268	1 162	— 106	45⅔	59,180	+ 5,700
Exeter Corporation.....	„ 11	291	316	+ 25	45	16,974	+ 984
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	„ 12	19,817	21,581	+ 1,764	37	803,407	+ 61,053
Glasgow Subway.....	„ 12	1,103	1,232	+ 129	6	7,650	+ 895
Glossop (U. Elec. Supp.)	„ 12	105	125	+ 20	7	935	+ 190
Halifax Corporation.....	„ 8	1,892	1,925	+ 33	44⅔	99,246	+ 1,117
Hastings & District.....	„ 11	718	724	+ 6	6	4,507	+ 334
Huddersfield Corp.	„ 12	2,175	2,562	+ 387	45	121,579	+ 16,633
Hull Corporation.....	„ 12	2,926	2,993	+ 67	45	140,834	— 1,051
Ilford U.D.C.	„ 11	558	597	+ 39	45	29,430	+ 3,288
Ilkeston Corporation ...	„ 16	112	130	+ 18	46	6,211	+ 383
Ipswich Corporation	„ 12	358	474	+ 116	44	24,670	+ 4,330
Isle of Thanet	„ 12	226	239	+ 13	19	4,934	— 945
Kilmarnock Corp.	„ 12	143	156	+ 13	39	6,583	+ 278
Lanarkshire	„ 10	1,660	2,108	+ 448	6	12,920	+ 2,210
Lancashire United	„ 9	1,495	1,545	+ 50	6	9,379	+ 668
Leeds City.....	„ 12	7,632	8,553	+ 921	46	408,917	+ 33,053
Leicester Corporation ...	„ 12	2,733	3,143	+ 410	6	19,735	+ 2,576
Leith Corporation	„ 12	623	748	+ 125	39	30,114	+ 2,462
Leyton U.D.C.....	„ 10	1,335	1,441	— 106	45	72,505	+ 9,204
Liverpool Corporation...	„ 12	11,940	12,837	+ 897	6½	83,358	+ 6,872
Llandudno & Colwyn B.	„ 11	181	190	+ 9	10½	1,955	+ 140
London County Council	Jan. 26	41,714	45,591	+ 3,877	43	1,908,553	— 654
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	Feb. 12	144	118	— 26	18½	3,287	— 805
Maidstone Corporation..	„ 10	157	171	+ 14	45	9,783	+ 475
Manchester Corp.....	„ 12	15,841	16,919	+ 1,078	45	812,366	+ 29,767
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	„ 12	151	179	+ 28	45½	8,887	+ 594
N'castle-on-Tyne Corp.	„ 12	5,660	5,633	— 27	46	282,373	+ 28,645
Newport (Mon.) Corp....	„ 12	705	819	+ 114	46	38,623	+ 1,765
New St. Helens & Dist.	„ 9	827	873	+ 46	32	32,849	+ 3 321
Northampton Corp.....	„ 11	612	680	+ 68	45⅔	32,869	+ 5,664
Nottingham Corp.....	„ 10	3,185	3,560	+ 375	45	168,744	+ 13,289
Oldham Corporation ...	„ 6	2,001	2,148	+ 147	46	104,400	+ 5,338
Portsmouth Corp.....	„ 12	2,021	2,061	+ 40	45	112,363	...
Preston Corporation.....	„ 9	847	982	+ 135	45	44,175	+ 2,627
Provincial	„ 12	1,747	1,930	+ 183	19½	39,739	+ 3,016
Reading Corporation.....	„ 10	657	722	+ 65	45½	35,847	+ 3,905
Rhondda Tramways.....	„ 3	1,074	1,223	+ 149	5	5,829	+ 521
Rochdale Corporation...	„ 12	1,377	1,477	+ 100	43½	77,370	+ 4,175
Rotherham Corp.....	„ 16	883	1,173	+ 290	45	54,580	+ 7,624
Salford Corporation.....	„ 14	4,527	4,990	+ 463	45⅔	237,796	+ 11,344
Sheffield Corporation....	„ 13	7,603	9,384	+ 1 780	46⅔	421,323	+ 59,761
Southampton Corp.....	„ 9	1,197	1,387	+ 190	45	67,847	+ 8,086
Southend-on-Sea Corp...	„ 9	617	582	— 35	45	36 193	— 7,954
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 12	670	722	+ 52	45⅔	36,081	+ 1,746
Sunderland Corp.....	„ 13	1,287	1,419	+ 132	46	69,025	+ 2,167
Sunderland District....	„ 9	463	545	+ 82	15	8,509	+ 834
Swindon Corporation ...	„ 2	152	183	+ 31	44	8,728	+ 808
Torquay Tramways.....	„ 3	353	414	+ 61	5	2,109	+ 228
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	„ 9	476	503	+ 27	6	2,900	+ 18
Wallasey Corporation ...	„ 12	995	1,090	+ 95	45⅔	57,809	+ 1,478
Walsall Corporation.....	„ 12	641	787	+ 146	7	5,128	+ 946
Walthamstow U.D.C....	„ 12	686	751	+ 65	46	40,335	+ 3,821
Warrington Corp.....	„ 3	414	486	+ 72	44	20,541	+ 1,279
West Ham Corporation	„ 10	2,776	2,954	+ 178	45½	139,851	+ 12,040
Wigan Corporation	„ 10	1,373	1,475	+ 102	45	68,591	+ 2,715
Wolverhampton Corp....	„ 16	951	1 109	+ 158	46	51,968	+ 3,446
Yorkshire (W. Riding)...	„ 13	1,311	1,701	+ 390	7	11,510	+ 1,637

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION

AND

MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 illustrations

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,

AMBERLEY HOUSE, NORFOLK STREET, LONDON W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 11.] LONDON, SATURDAY, FEBRUARY 26, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—in the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF BELFAST.

ELECTRICITY DEPARTMENT.

STORES.

The Tramways and Electricity Committee invite Tenders for the supply of the undermentioned materials:—

SECTION No. 1.

SUB-SECTION.

1. Mill furnishings.
2. Packings and asbestos goods.
3. Lubricating oils and petrol.
4. Rubber goods, waterproof coats and boots.
5. Bricks, firebricks, cement, road metal, sand, etc.
6. Tools.
7. Ironmongery.
8. Brushes, rope and twine.
9. Steam, gas, and water tubing.

SECTION No. 2.

SUB-SECTION.

1. Trolley wire.
2. Overhead line material.
3. Galvanized wires.

SECTION No. 3.

SUB-SECTION.

1. Vulcanized Bitumen Insulated cable.
2. Vulcanized india rubber cables and wires.
3. Electrical accessories.
4. Lamps.
5. Arc lamp carbons and carbon brushes.

SECTION No. 4.

SUB-SECTION.

1. Refined Trinidad bitumen.
2. Bitite strip, prepared tape and rubber tape for joints.
3. Joint box compound.
4. Fuse wires.
5. Wood troughing.
6. Stoneware troughing.
7. Cast-iron street box frames and covers.
8. Glazed stoneware conduits.
9. Cast and wrought iron pipes.
10. Lighting, feeder and section pillars.
11. Glazed stoneware or glass cable bridges.
12. Copper cable connectors.

SECTION No. 5.

SUB-SECTION.

1. Electricity meters.
2. Electricity maximum demand indicators.
3. Automatic time switches.
4. House service cut-outs.

Form of Tender of any of the Five Sections and further particulars may be obtained from Mr. T. W. BLOXAM, City Electrical Engineerg, East Bridge Street, Belfast, on payment of 10s. per Section, which will, after the Council or their Committee have come to a decision on the Tenders received, but not before, be returned to the Tenderer, provided he shall have sent in a bona-fide Tender, and shall not have withdrawn the same.

Alternative Tenders may be sent in for six or twelve months.

The whole or any part of a Tender sent in may be accepted, and Tenders shall be open for acceptance until May 1 next.

Tenders, endorsed "Tender for Stores, Electricity Department," to be lodged in my office not later than 10 a.m. on Wednesday, March 15, 1916.

An official receipt must be obtained for every Tender delivered by hand. Tenders sent by post must be registered, otherwise the undersigned will not be responsible.

The Council do not bind themselves to accept the lowest or any Tender.

R. MEYER,
Town Clerk

City Hall, Belfast.

CITY OF EDINBURGH.

EDINBURGH CORPORATION ELECTRICITY SUPPLY.

NEW ELECTRIC GENERATING STATION, PORTOBELLO.

TO CONTRACTORS FOR STRUCTURAL STEEL WORK.

The Magistrates and Council are prepared to receive Tenders for the works required in the Erection of the Structural Steel Work at the new Electric Generating Station, Portobello, all in accordance with relative plans, specifications, and conditions of contract. Sir Alexander B. W. Kennedy, M.I.C.E., 17, Victoria Street, Westminster, S.W., Engineer; Mr. James A. Williamson, A.R.I.B.A., Public Works Office, City Chambers, Edinburgh, Architect.

Copies of the plans, specification, and schedule of quantities, forms of Tender, and all other particulars, may be had on personal application to the latter at his Office as above, on and after Monday, the 28th curt.

A deposit of £3 3s. (payable by crossed cheque only), is required for the plans, specifications, schedules, etc., and this will be returned to those who send in a bona-fide tender and return the papers complete.

Tenders, and also schedules of quantities, must be lodged with the subscriber, not later than 10 a.m. on Monday, the 13th proximo, enclosed in separate official envelopes, which will be supplied, sealed and marked outside "Tender for Structural Steel Work, New Electric Generating Station, Portobello," or "Schedule for Do." as the case may be.

The Town Council shall not be bound to accept the lowest or any Tender.

THOMAS HUNTER, W.S.,
Town Clerk.

City Chambers, Edinburgh.
February 23, 1916.

COUNTY BOROUGH OF BOLTON.

TRAMWAYS DEPARTMENT.

The Tramways Committee of the Bolton Corporation invite Tenders for the following Materials and Stores for the year ending March 31, 1917:—

Overhead materials.
Gear and pinion wheels.
Brake blocks, iron castings, and malleable iron castings.
Motor and axle grease.
Waste and sponge cloths.
Lamps, carbons, insulating materials, etc.

Forms and specifications of Tender may be obtained on application to Mr. John Barnard, General Manager, Corporation Tramways, Bradshawgate, Bolton, on and after Monday next, February 21, 1916. Sealed tenders on forms provided, endorsed "—— Contract," to be addressed to the Chairman of the Tramways Committee, Tramways Office, Bradshawgate, Bolton, and must be delivered not later than 12 noon on Monday, March 6, 1916.

The Committee do not bind themselves to accept the lowest or any Tender.

SAMUEL PARKER,
Town Clerk.

Town Hall, Bolton.
February 18, 1916.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

STEEL CARRIAGE BOGIES.

The directors are prepared to receive tenders for the supply of Twelve Pressed Steel Carriage Bogies.

Particulars may be obtained from the Secretary on payment of five shillings, which will be refunded on receipt of a bona-fide tender.

Tenders should be delivered, under sealed cover, endorsed "Tender for Steel Carriage Bogies," to the undersigned, not later than 10 a.m. on Wednesday, March 1, 1916.

The directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
February 14, 1916.

Digitized by Google

TRAMWAY CARS FOR DISPOSAL.

Four Single-Deck Cars, mounted on Brush Maximum Traction Trucks. Bodies are constructed with closed compartments each end, and open with cross benches in centre. Seating capacity, 40 passengers (20 inside and 20 outside). Gauge, 4 ft. 8½ ins. Each car complete with 2 D.K. 25a motors, brush H.D. 2 controllers, ready for immediate service. Price, £350 each at Depot.—Apply, The MANAGER, Middleton Electric Traction Co., Hilton Fold Lane, Middleton, Lancs.

POSITIONS VACANT.

MILEAGE AND TIMETABLE CLERK.

Wanted.—A Mileage and Timetable Clerk for a large tramway system in the Metropolitan area. Applicants must have had considerable tramway experience, and preference will be given to men ineligible for military service. Applications, stating age, experience and salary required, together with copies of three recent testimonials, to be forwarded to Box No. 68, c/o "The Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

MANUFACTURER'S REPRESENTATIVE.

Wanted, resident in London, gentleman not engaged on munition work, and exempt from military service, to represent manufacturing firm, and call upon tramways in the South of England. Must have commercial experience, and first class references. Apply, stating age and salary required, to Box No. 35, c/o The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

DRAUGHTSMAN.

Wanted, for temporary engagement, a draughtsman to prepare plans, etc., for the construction of an Electricity Generating Station. Applications, stating age, experience, salary required, and when at liberty, accompanied by copies of two recent testimonials, to be addressed to the Borough Electrical Engineer, Eccles Corporation Electricity Works, Cawdor Street, Patricroft, Lancs.

Pole Paints &RC

As supplied to important Companies at home & abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples & Prices on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds. OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

COMPARATIVE TRAMWAY ACCOUNTS.

The latest Municipal Tramway Accounts are summarised in

THE TRAMWAY AND RAILWAY WORLD
OF FEBRUARY 10, 1915.

The capital and working reports are clearly and systematically arranged so that any required fact can be readily ascertained, while comparisons of results of the different systems can easily be made.

Particulars are given under the following heads:—

Capital Account :—
Borrowing Powers.
Borrowing Powers Exercised.
Unexhausted Borrowing Powers.
Capital Expenditure per mile of Single Track.
Loans Outstanding.
Sinking Fund and Loans Repaid.
Depreciation, Renewal and Reserve Funds.

Gross Receipts :—
Traffic.
Other Revenue.
Total.

Working Expenses :—
Traffic.
General.
Repairs and Maintenance.
Power.
Total.

Gross Profit on Working.

Reductions from Gross Profit :—
Interest.
Sinking Fund.
Income Tax.
Depreciation and Renewals.
Sundries.
Total.

Net Surplus or Deficit.

Appropriation of Net Surplus :—
Carried Forward.
Reserve.
Relief of Rates.

Percentage of Operating Expenses to Total Revenue.

Receipts per Car Mile :—
Average Total per Car Mile.
Average Traffic Total per Car Mile.

Operating Expenses per Car Mile :—
Traffic.
General.
Repairs and Maintenance.
Power.
Total.

Average Operating Expenses per Car Mile (excluding Power Cost).

Energy Consumption :—
No. of B. of T. Units used.
Cost per Unit.
Units used per Car Mile.

Traffic Records :—
Population served.
Car Mileage.
Passengers Carried.
Passengers Carried per Car Mile.
Average Fare per passenger.
Average Journeys per head of population served per annum.
Average Car Miles per day per Car.
Traffic Revenue per Mile of Single Track.
Average Traffic Revenue per annum per head of population served.
Operating expenses per passenger.
Average distance of 1d. fare.
Average fare charged per mile.
Average speed per hour.
Average Car hours per day.
Average number of Cars in use daily.
Number of Cars in stock.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, FEBRUARY 26, 1916.

TRAFFIC OBSTRUCTION.

Evidence accumulates of the need for a general by-law throughout the country to restrict all vehicles not running on rails to the side of the roadway, except when there is need to diverge in order to pass others proceeding in the same direction. The preference shown by slow-going vehicles in Glasgow for the crown of the roadway has this week led to a special exhortation to the drivers to desist from their practice now that the restricted lighting regulations have been extended to that city. The appeal has been made in the interest of tramway passengers and of public safety. It is a matter, however, that concerns motor traffic as well, not only in towns but in localities where an increasing amount of goods traffic is borne by motor conveyances owing to the congestion on the railways. In the pre-war period even pleasure motor-car owners had to institute police court proceedings against obstruction by horse vehicles, while at intervals the Glasgow Tramways Department have exercised the powers that they possess for dealing with similar hindrance to their cars. Another aspect of the matter that calls for attention in all towns and districts where there are tramways is the obstruction created by motor wagons whose speed is restricted to five miles per hour. In our last issue reference was made to the breaking down of these vehicles almost every day on the Manchester Tramways, thus causing a block on the lines until the department's breakdown gangs have cleared the track. Mr. J. M. McElroy, the general manager, set forth the cause of the obstruction in terms that sum up the experience of all tramway managers. On some roads, said Mr. McElroy, the drivers prefer the centre because of the camber at the side, while another reason is that the tramway track is kept in a better state of repair. But whatever the reason, he added, there ought to be a by-law to regulate this rapidly expanding traffic, so as to avoid the frequent dislocations. In support of his plea Mr. McElroy might have referred to the extra cost of maintenance entailed by the wear and tear resulting from the use of the permanent way by heavy motors. This is a question upon which a great deal has been said by the Highways Committee of the London County Council. Tramway undertakings generally can make out a good case for seeking the powers desired by the general manager at Manchester, and no time should be lost in making application to Parliament. The claim may be based on the by-laws granted not long ago to the London County Council. Under one by-law, slow-going traffic is compelled to keep to the near side of the road. This regulation is an advantage to all fast moving vehicles, and it is enforced by the police. If it is to be made really effective, however, magistrates should deal more severely than the Woolwich Bench did with six carters who were recently summoned. A police witness testified that the men were driving slowly in the centre of the road, thereby holding up tramcars and other traffic, although there was 12 feet of clear space between the rails and the pavement. To order offenders simply to pay two shillings costs cannot be described as a punishment, especially as the tramway conveys munition workers. A by-law more salutary in its effect enables the Council to proceed against owners whose vehicles break down on the tramway track owing to the conveyances being sent out in a defective condition. It is satisfactory to record that obstruction to tramcars from such a cause is becoming much less frequent. Commercial and pleasure motor interests, together with the police experiments in the West End, were largely responsible for the County Council securing the power for the prevention of obstruction by slow conveyances, and it would be a public benefit if the former classes would now proceed to educate commercial motor drivers upon the need of refraining from inconveniencing and causing loss to other road users.

MOTOR OMNIBUS COSTS IN LONDON.

Although the report of the London General Omnibus Company does not state the number of omnibus miles run and it is consequently impossible to arrive at the cost per omnibus mile from official figures, we believe that the working expenses for the past financial year have averaged 8¾*d.* per bus mile. Assuming this figure to be correct there has been an increase in expenses of 1¼*d.* per omnibus mile, in comparison with the previous year. In the circumstances, the result must be regarded as highly gratifying.

VEHICLE WORKERS AND EXEMPTION.

An alteration has apparently been made in the regulations affecting the liability of eligible tramway, omnibus, and power station workers for military or naval service in cases where the Minister of Munitions does not certify that their work is of importance for the purpose of carrying on munitions work. In the latest regulations issued by the Local Government Board for the guidance of Local Tribunals, the occupations hitherto known as "starred" or "reserved" occupations (in which a man could not enlist without the consent of his employer) are referred to as "certified occupations." The men engaged in such employments *may* be granted exemption from service according to the decision of the military representative on the Tribunal. Exemptions appear to be given by law only to the following classes:—Electrical generating stations (including those for tramways and electric railways).—All classes of workmen.

Omnibuses.—Head of department; foreman; motor-driver.

Tramways.—Traffic inspector; driver; chief storekeeper; parcel superintendent.

TRAMWAYS AND RESTRICTED LIGHTING.

Fines of 20*s.* were imposed at Blackpool police court on several tramcar conductors for failing to obscure the lights. The chief constable said that he had written many letters to the manager, but the solicitor who defended stated that the department had been sailing under an arrangement which they honestly thought had been entered into in the best interests of the community.

Yesterday (Friday) the restricted lighting order came into force in Glasgow. The tramways department have painted the windows of the cars halfway down both on the upper and lower decks. Nearly 20,000 inside lamps have been dipped in a dark solution. This work was facilitated by the fact that the lighting is in three circuits, thus enabling one-third of the lamps to be removed at one time. The indicators and dash lights have also been dulled.

At Southport the dash lights of the Corporation cars have been obscured, and red rear lights affixed. On the Tramways Company's cars the inner lights are shaded and the blinds are drawn, while on the Corporation cars the inner lights are shaded.

Digitized by Google

OPPOSITION TO DOUBLE-DECK CARS.

COLONEL DRUITT AND THE POSSIBILITY OF USING TRAILERS.

At the request of Colwyn Bay Urban Council, a Board of Trade inquiry was held on February 16 into the proposal of the Llandudno and Colwyn Bay Electric Railway Company to use double-deck cars on the section of the line between Rhos promenade and the Queen's Hotel, Old Colwyn. Lieut.-Colonel E. Druitt, R.E., conducted the inquiry.

On behalf of the Council, Mr. J. Amphlett urged that passengers on the tops of cars would be able to look into the lower rooms of the residences, and into the bedrooms, and this would interfere with the privacy of a good deal of valuable property. The roads were in many place very narrow, and there were severe corners, round which the traffic even now was conducted with difficulty. The present single-deck cars often frightened horses, and that danger would be worse if they were double-decked. Then there was an invidious distinction between Llandudno and Colwyn Bay. He submitted that the track was not fit to carry the proposed traffic, owing to its narrow gauge and the gradients. A point had been made by the company that they had spent a good deal of money in having the roads widened, but that was a fleabite as compared with what the Council had spent.

Several gentlemen having given evidence against the proposal, Colonel Druitt asked whether the Council had considered the possibility of running single deck trailer cars.

Mr. Amphlett replied that he believed there was an undertaking by the company that they would not make use of trailers. What was wanted was a more frequent and a more regular service.

Mr. Alex. G. Balfour (general manager of the company), said it was difficult under present war conditions to maintain a regular service, and practically all tramway companies had announced that they must be free to alter or curtail or even suspend the service without notice.

On behalf of the company, Mr. H. L. Williams stated that double-deck cars were used in thirty-four towns on a track of the same gauge, and in many cases the gradients and curves were less favourable than at Colwyn Bay. While Mr. Williams was reading the list of these towns, the Inspector remarked that Bournemouth was a typical place for comparison with Colwyn Bay. Mr. Amphlett asked if there was any opposition to double-decked cars there. The Inspector: The cars belong to the local authority.

Mr. Williams said there would be less overcrowding with two-decked cars, which would either be shorter to carry the same number of passengers, or, if they were the same length, they would accommodate more passengers. The company would like to run double-deck cars at Llandudno, but there was a sleeper track between the two towns, and the Board of Trade rules would not allow double-deck cars on the sleeper track where it was not paved between the rails.

Colonel Druitt stated that he would make his report in due course.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council on Tuesday, the Highways Committee reported that they had been considering what accommodation should be provided for trailer cars to be run on the Tooley Street route, and they suggested that the depot in Evelyn Street, Deptford, should be adapted for the purpose. These premises were formerly used as a granary and horse car depot, and the necessary structural alterations would cost about £2,000. As the arrangement would be temporary, they proposed that the expenditure should be charged to maintenance account.

The necessary application has been made to the Board of Trade for extensions of time for the construction of (1) the widening at the junction of Farringdon Road and Clerkenwell Road, and (2) certain tramways authorised by the London County Council (Tramways and Improvements) Acts, 1909 and 1913.

WOMEN CONDUCTORS' CLOTHING.

Mr. J. D. GILBERT, M.P., asked the Chairman of the Highways Committee—(1) What clothing was supplied free to women conductors on the trams, and (2) Whether the Committee would provide waterproof capes for women employed on the trailer cars which have no covered tops?

Mr. G. H. HUME (Chairman of the Highways Committee) replied that the complete outfit of clothing supplied free to women conductors consists of one coat and skirt, one hat, one pair of gaiters, one belt, one waterproof coat, and certain undergarments. Capes were not necessary in addition to the waterproof coats now supplied.

All tramway reports were adopted.

LOCAL AUTHORITIES AND ENEMY CONTRACTS.

The Special Committee on Standing Orders recommended Glasgow City Council to pass the following resolution: "That during the period of the war no contract be entered into with any person of German or Austrian nationality; or with any firm or company whose subscribed capital (whether by way of shares or otherwise) is held or controlled to the extent of one-third or upwards by persons of German or Austrian nationality."

Lambeth and Battersea Councils have passed the following resolution: "That the time has arrived for legislation to be framed to protect our people against the return of trading aliens after the war; that such legislation should take the form of licensing all professional and trading concerns." Copies have been sent to the Government, the metropolitan Members of Parliament, and to the other local authorities of London.

THE COPPER SHORTAGE IN GERMANY.

A noticeable feature in the recent issues of the German technical papers is the large number of advertisements for zinc cables, wires, rods, etc., to be used instead of copper. It appears to be a fact that there is absolutely no copper on the market, and any new project must be undertaken on the assumption that copper will have to be entirely dispensed with. Zinc and a combination of zinc and iron, however, seem to have taken its place quite satisfactorily, although of course the bulk and weight are greater, as the relative conductivities of zinc and copper may be taken as 2 to 7.

An article on the suitability of zinc as a high tension conductor appears in a current number of the "Electrotechnische Zeitschrift." At first, it says, fears were entertained that such cables would be liable to melt or crumble away under a heavy current; but owing to the larger amount of metal required, more heat has been found necessary to bring about the same rise of temperature as in the case of the thinner copper wire. Experiments have shown that even under a heavy short circuit lasting six hours very small deterioration occurred. The only drawback to the use of zinc for conductors therefore appears to be the increased size and weight.

WOOD PULP AND TICKETS.

MR. HENRY MOZLEY'S SUGGESTION.

The contractors for the supply of tickets have informed Walthamstow Tramways Committee that the restriction of the importation of wood pulp would necessitate the cutting down the usual supply of tickets to one-half. The Committee have therefore recommended the Council to ask the Board of Trade to withdraw the restrictions as far as tramway undertakings are concerned.—In connection with the reduction of imported paper-making material, Mr. Henry Mozley, general manager, Burnley Corporation Tramways, writes:—"For many years I have advocated the collection of tickets by the conductor for the purpose of checking the fares, but the restriction of imported paper-making material, particularly wood pulp, by one-third, furnishes another powerful reason why my contentions should be admitted. I submit that the lessened supply of ticket-making material would be largely met by all tramway and omnibus authorities collecting, packing, and returning the tickets after use to the ticket material makers, by ordinary sale or arrangement with the printers."

DECREASE OF LONDON LICENCES.

In the House of Commons the Home Secretary, on February 17, informed Sir H. Norman that the numbers of London licences for drivers and vehicles issued in July, 1914, and January last were as follow:—

	Jan., 1916.	July, 1914.
Motor-cabs	5,813	7,746
Horsed Cabs	946	1,666
Omnibuses	2,707	3,876
Tramcars	2,733	2,850
Hackney drivers	9,164	11,935
Stage drivers and composite	10,082	11,581
Assistant conductors	12	25
Conductors	10,290	12,553

MISCELLANEOUS NEWS AND NOTES.

New Omnibus Service at Sheffield.—The Tramways Department have instituted a motor omnibus service from Frith Park tramway terminus to Ecclesfield.

Motor Omnibus and Railless Trolley Car.—At the request of Reading Town Council, Mr. G. F. Craven, the tramways manager and electrical engineer, is preparing a report setting forth the respective claims of motor omnibus and railless trolley car services.

Death of the Injured Mayoress.—An inquest was held on February 22 on the Mayoress of a Midland town who died of injuries received in the air raid on January 31. The Mayor said his wife told him she was in a tramcar at the time. A vote of sympathy was passed to the Mayor and relatives.

Reconstruction of Belgian Railways.—It is reported that Mr. J. J. Hill, president of the Great Northern Railway, U.S.A., has been invited to take the direction of the work of reconstructing the Belgian railways and buildings after the cessation of hostilities. The "Central News" states that Mr. Hill has informed King Albert that he is willing to accept the task.

Electric Plant Required.—Alderman H. Coupe, chairman of Rawtenstall Tramways and Electricity Committee, has presented a recommendation to the Finance Committee to arrange for the provision of £11,000 for the purchase of new plant for the electricity works to enable an additional supply of power to be given to local consumers and a bulk supply to Haslingden Council for use in that town and in Bacup.

The Institution of Automobile Engineers.—The next meeting will be held on Wednesday, March 8, at the Royal Society of Arts, John Street, Adelphi, W.C., at 8 p.m., when Mr. J. Lawrence Hodgson, B.Sc., A.M. Inst. C.E., will read a paper entitled "The Fan Dynamometer." Cards of invitation may be obtained on application to the Secretary, I.A.E., 28, Victoria Street, London, S.W.

The Snowfall.—Throughout the country there was a heavy fall of snow on Wednesday night and Thursday morning, with the result that railway and tramway traffic were impeded. In London the early rush traffic got through without delay, but the subsequent fall of temperature created obstruction at crossings. The result was seen in considerable disorganisation of tramway traffic between 10 a.m. and noon, the supply of labour and ploughs being insufficient to keep the tramways clear.

Digitized by Google

"Entirely British."—Under this heading the "Daily Graphic" recently published an illustrated article dealing with the works of the Edison and Swan Electric Light Company at Ponder's End, Middlesex. The company, whose London showrooms are at 123-125, Queen Victoria Street, E.C., and 71, Victoria Street, S.W., was founded in 1883, this being one of the oldest firms of lamp makers in the kingdom. The company's electrical manufactures are described as "entirely British."

Interference with Women Conductors.—In several towns the magistrates have made examples of men charged with drunkenness, using obscene language, or assaulting women conductors. At Newcastle a defendant who was charged with assault was sentenced to a month's hard labour. The police superintendent announced that Mr. T. P. Easten, the assistant manager of the tramways, was in court, and he could speak to several men having interfered during the last ten days with the women conductors.

More Traffic for West Ham Tramways.—In order to rehouse workers displaced by the extension of the Royal Albert Dock, the Port of London Authority have recently completed the erection of 240 cottages on garden city lines adjoining Prince Regent's Lane, West Ham. The Corporation Tramways pass the estate, which is likely to be further developed, to the benefit of the tramways. Up to February 10 the tramway receipts for the year that began on March 31 last showed an increase of £12,040.

War Demand for Steel in America.—Writing to the New York "Electric Railway Journal," the sales manager of the Niles Car and Manufacturing Company says: "Any railways or manufacturers who are depending on steel from the mills for their cars probably will not receive them this year. We are figuring 1 per cent. per pound premium for quick delivery on all steel wanted for cars to be used this summer, and the situation is getting worse. Any railway needing cars for summer service probably will be compelled to offer a bonus for early delivery."

Trailers in London.—On February 21 trailers were attached to a number of cars on the Brixton, Streatham and Norbury route of the London County Council Tramways. Women conductors were in charge of the trailers, some of which are shunted at Telford Avenue car shed, and others at the Norbury terminus of the London—Croydon service. As will be seen by the report of the Council's meeting this week, the Highways Committee are taking steps to introduce trailers on the London Bridge, Greenwich and Woolwich route.

Prosperity at Glasgow.—From June 1, when the financial year opened, to February 19, the tramway receipts have been £825,175, an increase of £62,749 as compared with the corresponding period of the preceding year. The number of passengers has been 259,064,722, as against 239,438,245. For the week ended February 19 the cars ran 478,510 miles, an increase of 10,045 miles as compared with the corresponding week, and carried 7,021,361 passengers, an increase of 590,934; while the receipts were £21,769, an increase of £1,678.

A Subsidence at Dover.—Owing to the appearance of a strong spring, fifty yards of tramway track subsided in Snargate Street. The surveyor has put in new concrete and laid new rails on steel joists. The cost of the rails exceeded £13 per ton, and the total expenditure is estimated at £800. On the motion of Councillor E. Chitty, the Council have instructed the Tramways Committee when preparing the forthcoming estimate for 1915-16, to carry forward as a reserve fund the money unexpended on the permanent way during the past year.

Opening of a Tramway on a Grass Track.—Colonel Druitt, R.E., on February 21 inspected the extension of Doncaster Corporation Tramways to the new villages of Woodlands and Highfields, near Brodsworth Colliery, and in the afternoon the public service was inaugurated. The extension has cost £20,000, of which sum about £2,000 was expended in the removal of telegraph poles, the track for the most part being on the grass verge on the west side of the Great North Road. This idea emanated from Mr. E. S. Rayner, the tramways manager and electrical engineer. As the track will not be used by other traffic its maintenance cost should be low.

Motor Services in Bristol.—The motor department of the Bristol Tramways and Carriage Company have been notably successful during the past year, the traffic receipts having increased over 23 per cent. The Avonmouth motor omnibus route has shown particular growth, and a much-needed service between Tewkesbury and Cheltenham has been inaugurated, but the opening of other contemplated services in Bristol and other districts was postponed during the war. The motor construction works at Brislington are doing good service in the construction of war munitions, including the making of aeroplane parts and fittings, and the construction and repair of motor workshops and lorries for the Army.

Cause of Railway Delays.—From a report presented to Halifax Chamber of Commerce on February 23, giving the results of interviews with the district goods managers of four great railways, it appears that the cause of the delays in the delivery of goods is the congestion at the ports. A Ports Commission had been formed, which was going from port to port inquiring into the congestion. Speaking at the annual meeting of the South Eastern and Chatham Railway, the chairman said they had been running an average of over 100 special trains a day. War had converted a passenger line into a heavy line. The closing of sea-borne traffic had also added considerably to their difficulties, as goods trains had been received from the north.

Bristol Tramwaymen with the Forces.—Since the beginning of the war 1,095 employees of the Bristol Tramways and Carriage Company have joined His Majesty's forces, and 702 men have attested under Lord Derby's scheme. Those already in service include 247 trained motor drivers. Altogether about 90 per cent. of the eligible employees not actually engaged in munition work are with the forces. To those employees on active service who have families or relatives dependent upon them, weekly allowances have been paid during the past year amounting to £11,737. The depletion of the staff owing to recruiting has necessarily restricted some of the services, but the company have made every effort to reduce the public inconvenience to a minimum.

Effect of Increased Fares at Belfast.—At the February meeting of the Corporation, Alderman J. Tyrrell stated that soon after he was appointed to the chairmanship of the Tramways and Electricity Committee, he expressed the opinion that some of the services were too liberal and the fares too low, and a modification was made. The results of the change justified it completely. In 1914, from April 1 to September 9, the receipts from penny fares were £99,910, in the same period of 1915 they were £98,375, a decrease of £1,535. From twopenny fares the receipts for the same months were, 1914, £17,572; 1915, £17,423, a decrease of £149. In the six weeks following September 11 the receipts from penny fares were, 1914, £65,185; 1915 (after the alteration), £68,649. The receipts from twopenny fares for the same six weeks were, 1914, £9,142; 1915, £11,019, an increase of £1,876. This showed that the changes were amply justified financially.

The Melbourne Tramways.—The appointment is reported in the "Melbourne Age" of a Government board to take over control of the cable tramway system temporarily, when the company's lease expires some months hence. The following gentlemen have been named to constitute the board: Mr. C. Templeton (chairman), Sir David Hennessy (Lord Mayor), Sir Henry Weedon, Mr. A. Renfrew, Mr. F. T. Hickford. With the exception of Mr. Templeton, the State Premier said, all the above are members of the present tramways trust. Control of the system remains in the hands of the company's directors until the lease expires. "It is expected," says the "Age," "that the Government will this year make proposals to Parliament for the permanent management of the tramways, which were to have been taken over by the Greater Melbourne Council next July, had the Bill for the creation of the council been carried."

Seasoning of Timber.—Messrs. Joseph Owen & Sons, Ltd., of Stanley Road, Liverpool, have sent to us particulars of a system that is intended to obviate the stocking of timber for prolonged periods for the purpose of seasoning. The plant used in the Owenized system of rapid seasoning is simple, and it can be carried out by unskilled labour. It consists generally in placing the unseasoned timber in a large cylinder or chamber, and subsequently subjecting it to steam, introduced into the cylinder, and a vacuum, or repetition of the steam and vacuum actions, depending on the class of timber that is being treated. Hot air, conjointly with certain gaseous products produced in a simple distilling apparatus, is then introduced into the cylinder containing the wood. When the operation has been completed, the timber will be found to be seasoned, and possesses the advantage, amongst others, of being able to withstand the action of the weather equally with timber weather seasoned, this being due to the nature and character of the gaseous products referred to, which are absorbed by the timber, and to the treatment in general; while at the same time, the timber is not checked or split, and, moreover, retains all its "life."

PERSONAL.

Mr. F. W. Bricknell, city engineer of Hull, and permanent way engineer to the Tramways department, has been transferred from associate to full membership of the Institution of Civil Engineers.

Sir Charles A. Parsons, K.C.B., F.R.S., has been appointed a member of the Advisory Council by the Privy Council Committee, for Scientific and Industrial Research.

Mr. W. P. Thomas, of the Llanelly and District Electric Lighting and Traction Company, has been appointed junior engineer-in-charge at Newport Corporation power station.

Sergeant C. F. Claxton, 6th Divisional Ammunition Column, R.F.A., who has been awarded the Distinguished Conduct Medal for gallantry in action, was a conductor on the Liverpool Corporation Tramways. He was a reservist when the war broke out.

Alderman A. E. Buxton will be proposed, on March 7, by the Municipal Reform Party, as chairman of London County Council for the ensuing year. It is understood that the motion will be seconded on behalf of the Progressives. Mr. W. J. Squires, who until two years ago was chairman of the Highways Committee, and has twice been Mayor of Woolwich, will be proposed as vice-chairman.

Mr. R. B. Holt, highways and permanent way engineer of Leeds, and a number of other members of the Institution of Municipal and County Engineers, recently asked the Council to consider the question of allowing indication of membership of the Institution of Civil Engineers of Ireland to be inserted in the list of members. The Council have decided to add the institution in question to the list approved on September 25, 1915.

Mr. F. W. Mackinney.—The General Purposes Committee of the London County Council, at the meeting on Tuesday, reported that the Army Council had intimated that they would be able to release Mr. F. W. Mackinney, the Council's chief officer of stores, whose services had, at their request, been placed at their disposal. The Committee, in communicating this decision, expressed their gratification that the Army Council had placed on record their very high appreciation of the valuable services which Mr. Mackinney had rendered to the State in a time of national emergency.

Mr. T. D. Courcy Meade, the city surveyor of Manchester, has died after a short illness. In the early part of his career Mr. Meade was engaged in railway construction in Ireland. In 1894 he received the Manchester appointment, in which he carried out many great works. In adopting upcast shafts for sewer ventilation, he utilised a large number of them as tramway standards.

Digitized by Google

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

It is proposed to hold the annual meeting and congress on Friday, June 30. Some of the out-of-town members having expressed a wish that matters should be so arranged as not to necessitate their spending more than one night in town, it has been decided to have the papers and lectures at 2 30 p.m., and to devote the afternoon thereto. Members and their friends will dine together at 7.30 p m. The same procedure will be adopted as last year—i.e., the dinner will be quite informal, and there will be no official guests, and no musical entertainment. The Secretary of the Association, Mr. A. de Turckheim, will be glad to hear from any member who wishes to read a paper.

CONTRACTS AND ORDERS.

Leyland Motors, Limited, Lancs., have received a contract for the supply of motor lorry bodies to the War Office.

Glasgow Tramways Committee have placed the following contracts: Traction lamps, General Electric Co., Ltd., and Edison & Swan Co., Ltd.; lighting conduits and fittings, Simplex Conduits, Ltd.

The Midland Railway Company has again accepted the tender of the General Electric Company for the supply of Osram drawn-wire lamps for the ensuing twelve months.

Poplar Council have been advised by the Electricity and Works Committee to purchase a 4-ton Edison accumulator wagon and a 4-ton Foden steam wagon, each with a tipping body, for the removal of ash and clinker from the electricity and destructor works.

The Supply of Tickets.—The Bell Punch Ticket Company have asked Dover Council for immediate relief in regard to their contract. A circular has been received stating that owing to Government restrictions, the supply of paper for tickets would be limited by fifty per cent. of the existing supply, and it was suggested that a representation should be made to the Board of Trade. The tramways manager has informed the Council that tickets half the present size would do, or paper tickets could be used.

FINANCIAL REPORTS AND MEETINGS.

Mersey Railway Company.—The net revenue for 1915 amounted to £21,442, compared with £21,279. It is proposed to pay interest of 1 per cent. on the B debenture stock.

Mansfield and District Tramways. The report for 1915 shows that the profit for the year, including the balance brought forward, amounts to £14,148, and, after carrying forward £1,544, and making other payments, there is a sum available for the payment of a dividend at the rate of 7 per cent. Last year the dividend was 6 per cent.

Lancashire United Tramways Company.—Traffic receipts for 1915 were £90,578, and miscellaneous receipts and electrical energy sold £6,249. Working expenses were £54,933, cost of generating electrical energy sold £4,006, general charges £5,240, and rent of leased lines £5,191. After providing for interest on the prior lien debenture stock there remains £198 to be carried to the depreciation account.

L.C.C. Tramway Receipts.—The tramway receipts from April 1, 1915, to February 9, 1916, were £1,997,098, a decrease of £4,516 as compared with the corresponding period of last year. For the two weeks ended February 9, the number of passengers was 20,985,116 a decrease of 933,486 over the corresponding period of 1915, while the receipts were £88,545, a decrease of £3,862. The route mileage worked was 141.67 miles.

Straker-Squire Dividend.—For the nine months to October 4 last, £10,000 is placed to reserve, £7,982 carried forward, and a dividend at the rate of ten per cent. is proposed. The directors also propose to pay an interim dividend at the rate of ten per cent. per annum, to December 31, 1915, in respect of the current year's work from October 5, making a total distribution of one shilling per share, less income tax.

Para Electric Railways and Lighting Company.—Receipts for the year ended November 30 were £243,483, and working expenses £115,309, leaving £128,174 as net revenue, whilst £20,030 was brought forward. There was a loss of £33,205 on remittances, and debenture interest and redemption charges absorb £38,500. A dividend of 5 per cent. is proposed on the ordinary shares, adding £15,000 to the depreciation and renewals fund, and carrying forward £18,935.

Hull Tramways Grant to the Rates.—A statement of the probable income and expenditure for the year ended March 31 next was presented to the Tramways Committee on February 16. The expenditure is estimated at £154,001, and the income at £167,763, leaving a balance of £13,762. The Lord Mayor (Alderman Hargreaves) said that the amount for general repairs showed a reduction from £31,312 to £27,575, but there was an increase for fuel from £6,480 to £8,291, while income tax had risen from £576 to £1,700. The reserve fund amounted to £142,748. There had been carried over the tramway about five million troops for nothing, and the halfpenny stages had been maintained. The Committee adopted the Lord Mayor's suggestion that they might safely grant £10,000 for the relief of the rates.

Progress of a London Suburban Electrification.—At the annual meeting of the London, Brighton, and South Coast Railway, on February 23, the Earl of Bessborough (chairman) stated that the main item of capital expenditure during the past year was the sum spent on the equipment of suburban lines for electrical traction. The war had necessarily suspended this work, but they were now proceeding steadily with that scheme. The existing electric services were working most satisfactorily, and showing excellent results, the increase in the number of passengers carried last year being fifteen per cent. higher than in 1914. Since the opening, five years ago, over 40,000,000 more passengers had been carried.

The Bristol Tramways and Carriage Company.—The report for the year ended December 31, 1915, shows gross receipts £512,385, and working expenses £413,521, leaving a net revenue of £98,864, as compared with £82,591 in 1914. After payment of debenture interest, and dividend on the four per cent. preference shares, the directors recommend a final dividend at the rate of six per cent. per annum, making five per cent. for the year, on the ordinary shares. The sum of £20,000 is reserved for contingencies and renewals, and £5,055 carried forward. The tramways department shows an increase of 3.63 per cent. in receipts, and the carriage and motor department 23.39 per cent. The total number of passengers (both departments) was 60,272,400, an increase of 1,970,815. The tramway and motor works at Brislington have been largely employed in the production of munitions, including the making of aeroplane parts and fittings. During the year the Bristol Corporation have been negotiating with the company as to the former's option of purchasing the undertaking, but without any result. The Treasury have refused consent to any public issue of stock by the Corporation for the tramway purchase, but the directors offer to recommend the shareholders to approve the purchase price being satisfied by the issue of Corporation stock to return half per cent. more than the market yield of the Government stock at the date of the award, but the offer has not been accepted. The directors say that they have shown every desire to meet the convenience of the Corporation, and while they cannot leave such an offer open indefinitely, they are ready to aid in carrying the business through if there is any possibility of doing so.

Liverpool Corporation Tramways.—In submitting the estimates for the year ending December 31 next, Councillor Russell Taylor (chairman of the Tramways Committee) said that for the past year it had been made possible to hand over to the rates £100,000 from the tramways profits, and £50,000 from the electric supply department, by the efficient working of Mr. Mallins, Mr. Dickinson, and the staffs under them. A vastly increased expenditure had been placed upon the tramways, but owing to the work that had been done and the savings effected, the balance sheet showed in the net result only £11,000 below the prosperous year of 1914. They had carried free 4,984,409 soldiers, sailors, nurses and doctors. The total number of passengers was 137,156,000, or 3,151,000 more. Owing to the forethought of the manager, the car mileage had been reduced by 995,274 miles. He appealed to the public to continue their goodness towards the tramways and their servants in case there was an increase in the number of strap-hangers. For a penny a passenger was carried 3⅜ miles, and if they reduced by 1.10th of a penny the penny fare paid by the 137 million passengers, it would lead to the wiping out of the profit handed over in relief of the rates, and possibly a loss. He warned the Council not to expect £50,000 next year in relief of the rates from the electricity department, as the coal bill was likely to be £22,000 more, in addition to which they would have higher wages and other extra expenditure. Alderman Smith said that the changes introduced at Lambeth Road depôt by Mr. Mallins enabled them to keep the cars in repair, and that had materially added to the result. The new electrical machinery, put in since Mr. Dickinson came, had reduced the cost of power.

London General Omnibus Company.—The annual meeting was held on Thursday, Mr. C. J. Cater Scott presiding. The Chairman, in submitting the report and accounts, said they were the first issued since the agreement constituting the common fund was entered into under the powers of the London Electric Railway Companies Facilities Act, 1915. The parties to the agreement were the City and South London, Central London, London Electric and Metropolitan District Railway Companies and their own company. For the year under review their proportion of the common fund was forty per cent. The gross receipts amounted to £2,882,410, a decrease of £344,129 compared with 1914. After making allowance for depreciation of leases, plant, machinery, etc., and reserve for contingencies and renewals, there was a balance of £271,519. The balance from last account was £64,547, and the interest discounts and dividends on investments, £50,440. The interest on the four and a-half per cent. first debenture stock was £44,045, and on the five per cent. cumulative income debenture stock, £50,000. The amount credited to the four and a-half per cent. first debenture sinking account was £10,954, and £10,000 had been written off preliminary and liquidation expenses. There had been a loss of £9,664 on realisation of investments through the general depreciation, while the conversion of consols into four and a-half per cent war loan stock, resulted in a further loss of £6,513. The amount written off discount on issues of debenture stocks was £10,236. Those items totalled £141,413, leaving a balance of £245,093 carried to profit and loss account. For the half-year ended June 30, the directors declared an interim dividend, free of income tax, on ordinary shares of six per cent., and it was recommended that a further dividend of six per cent., free of income tax, be paid. The further dividend would absorb £114,661, leaving a balance of £23,237 to be carried forward. Those dividends compared with sixteen per cent., free of income tax, for the year 1914, and the carry-forward was reduced by £41,310. The serious depletion of the staff and the large number of omnibuses taken by the Government had placed additional responsibilities upon those who remained behind, and those responsibilities were increased by the darkness of the streets at night. The time had come when they could not maintain the present services with the men available. The management had, therefore, made arrangements for training women as conductors, and if it was done as well as certain work was done by women on the Underground Railways, neither the company nor the public would have occasion to find fault.

(*Continued on page* 176).

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last	Name.	Paid.	Price, July 27 1914	Cash. Feb. 24.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	67	67½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	81/3	81/10½
4%	4%	Do. 4% Deb. ...	100	91	72½	71⅜
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	74
5%	5%	Do. 5% Deb. ...	100	96	78	79⅜
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	19/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92¾	92¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10	10
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	98	98
$¼	$½	Brazilian Trac. & Power Ord. ...	$100	66	51½	52¾
$1½	$1½	Do. 6% Cum. Pref.	$100	97	90	90¾
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 15/32	6 9/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	36	36
5%	5%	Do. 5% Cum. Pref.	100	103	57½	57½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½*	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	64¾
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75½	75
70/-	70/-*	Do. 7% Pref.	100	55½	47¾	47½
—	—	Do. 6% Pref. Ord.	100	17½	15¾	16½
—	—	Do. Def. Ord.	100	11	9¾	9¾
5%	5%	Do. 5% Deb.	100	92	82¾	82½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	66	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87½	87
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6	6 3/32
1/3	1/3	City of B.A. Trams.	5	5½	92/6xd	92/6
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	86	85
6/-	6/-	Dublin United Trys 6% Pref.	10	12	11 3/16	11 3/16
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	10 1/16xd	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½xd	9/10½
—	1⅞d.	Lond. & Sub. Traction Ord. ...	1	15/64	2/3	2/1½
6d.	6d.	Do. 5% Pref.	1	9/16	9/1½	8/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	55½	59
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	83¾	83¾xd
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103⅜	103⅜
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	75½	75¼
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78½	78½
$1¾	$1¾	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40	42
6%	6%	Do. 6% Mt. Bds.	100	76	39½	39½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½	94½
1/2*	1/2⅝*	National Steam Car	1	15/32	11/6	12/-
9¾d.*	9¾d.*	New General Traction	1	½	7/9	7/9
1/2⅝	6d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4½	58/-	67/6
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	13/32	10/1½	10/1½xd
8d.	10d.	Provincial Trams. Ord.	1	¾	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	88	89
5%	5%	1st. Mt. 5% 50 yr.	100	89½	73	73
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89	89
5%	5%	Do. 5% Perp. Deb.	100	99½	77¾xd	77¾
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76½	78
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Increase or Dec.
Anglo-Argentine.....	Feb. 18	£47,578	£50,359	7	£346,284 —	£5,911
Auckland.....(28 days)	Jan. 14	22,164	22,868	28	148,708 +	1,612
Ballarat and Bendigo ...	Dec. 5	3,498	3,397	36	28,494 —	2,771
Brazilian Traction Mlrs.	Dec.	6,010,490	6,527,000	52	77,113,110 +	3,761,632
Brisbane	Jan.	29,620	32,280	4	32,280 +	2,660
British Columbia.....$	Dec.	674,063	603,667	26	3,240,146 —	758,753
Buenos Aires Lacroze ...	Jan. 7	43,301	40,596	30	291,525 —	4,741
Burmah Tramway ... Rs.	Feb. 19	3,727	3,614	...	103,177 +	6,809
Calcutta.....Rs.	„ 19	62,934	68,165	7	486,074 +	24,977
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias..	Jan.	904	2,841	4	2,841 +	1,937
Cordoba	Dec.	12,091	13,025	34	124,148 +	4,718
East India	Jan.	1,914	2,015	26	12,531 +	650
Hong Kong .....$	Jan. 22	9,340	11,299	7	43,898 +	5,090
Kalgoorlie	Nov.	2,414	2,611	48	30,402 +	1,483
La Plata	Jan.	4,540	4,533	4	4,533 —	7
Lima	Dec.	32,411	34,685	52	385,854 —	7,338
Lisbon .....Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks).....Rs.	Feb. 15	27,430	29,860	6	96,243 +	11,427
Manila .....$	Dec.	132,500	141,350	52	1,495,534 —	108,031
Manaos	June	12,530	9,868	8	20,067 —	5,340
Melbourne.....	Dec.	...	72,658	...	...	...
Mexico .....$	*	...	...	...	...	...
Montevideo.....	Jan.	32,459	34,252	13	93,964 +	5,818
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon.....	Jan.	4,689	4,763	4	4,763 +	74
Shanghai .....$	Jan. 26	22,520	25,932	...	...	...
Singapore .....$	Jan. 22	9,900	11,804	3	35,609 +	6,038
Toronto.....$	Nov.	824,634	851,113	48	8,793,719 —	502,658
Winnipeg	Dec.	368,400	377,191	52	3,499,741 —	601,561

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Incr. or Dec.
Aberdeen Corporation...	Feb. 16	£1,564	£1,634	+ £70	37	£66,945	+ £4,438
Accrington Corp.....	„ 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	„ 19	226	259	+ 33	41	14,898	+ 1,044
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 20	1 199	1,372	+ 173	46½	64,443	+ 5,940
Birmingham Corp.	„ 12	11,922	15 277	+ 3.355	46	660,010	+ 102 101
Blackburn Corp.	„ 16	996	1 050	+ 54	46⅔	58,502	+ 210
Blackpool & Fleetwood.	„ 19	283	288	+ 5	7	2,299	+ 145
Blackpool Corp.	„ 17	578	679	+ 101	47	74,611	+ 2.892
Bolton Corporation.....	„ 19	2,569	2,550	— 19	47	125,752	— 330
Bournemouth Corp.....	„ 23	1,781	1,818	+ 37	47	99,028	+ 5,511
Bradford Corporation ...	„ 19	5,710	5,936	+ 226	47	300,471	+ 12,917
Brighton Corporation ...	„ 20	801	831	+ 30	46½	51,125	— 1,107
Bristol	„ 18	8,250	9,106	+ 856	7	65,528	+ 6,910
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 19	1,378	1,512	+ 134	47	75,156	+ 3,115
Burton-on-Trent Corp...	„ 20	254	230	— 34	47	13,244	— 346
Bury Corporation.....	„ 20	1,213	1,209	— 4	46½	62,741	+ 468
Cardiff Corporation.....	„ 12	2,404	2,613	+ 209	45	123,330	— 541
Chatham & District.....	„ 17	931	1,079	+ 148	7	7,315	+ 722
Chesterfield Corp.	„ 17	232	251	+ 19	46	12,462	+ 156
Colne Corporation	„ 19	219	228	+ 9	...	...	...
Cork Electric	„ 17	440	447	+ 7	7	3,163	+ 163
Croydon Corporation ...	„ 11	1,567	1,568	+ 1	45	82,609	+ 5,377
Derby Corporation	„ 19	903	1,032	+ 129	46⅔	49,009	+ 2,396
Dover Corporation	„ 19	235	247	+ 12	46	14,226	+ 2,315
Dublin & Lucan	„ 18	109	109	nil	7	806	+ 8
Dublin United	„ 18	5,426	5,749	+ 323	7	41,409	+ 2,627
Dundee City	„ 16	1.197	1,294	+ 97	39½	54,033	+ 3,252
East Ham Corporation	„ 19	1,197	1.211	+ 14	46⅔	60,392	+ 5,714
Exeter Corporation.....	„ 18	298	324	+ 26	46	17,298	+ 1,010
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	„ 19	20,091	21,769	+ 1,678	38	825,176	+ 62,750
Glasgow Subway.....	„ 19	1,083	1,247	+ 164	7	8,897	+ 1,059
Glossop (U. Elec. Supp.)	„ 19	109	127	+ 18	8	1,062	+ 209
Halifax Corporation.....	„ 15	1,904	1,890	— 14	45⅔	101,136	+ 1,103
Hastings & District.....	„ 18	670	714	+ 44	7	5,221	+ 377
Huddersfield Corp.	„ 19	2,272	2,620	+ 348	46	124,199	+ 16,981
Hull Corporation	„ 19	2,985	3,089	+ 104	46	143,924	— 947
Ilford U.D.C.	„ 19	557	613	+ 65	46	30,042	+ 3,359
Ilkeston Corporation ...	„ 23	113	126	+ 13	47	6,338	+ 397
Ipswich Corporation	„ 19	359	495	+ 136	45	25,166	+ 4,475
Isle of Thanet	„ 19	212	230	+ 18	20	5,163	— 927
Kilmarnock Corp.	„ 19	144	161	+ 17	40	6,744	+ 295
Lanarkshire	„ 17	1,711	2,044	+ 333	7	14,964	+ 2,543
Lancashire United	„ 16	1,467	1,581	+ 114	7	10,971	+ 788
Leeds City.....	„ 19	7,978	8,790	+ 812	47	417,707	+ 34,116
Leicester Corporation ...	„ 19	2,769	3,241	+ 472	7	22,977	+ 3,076
Leith Corporation	„ 19	620	711	+ 91	40	30,825	+ 2,552
Leyton U.D.C.....	„ 17	1,490	1,456	— 34	46	73,961	+ 9,170
Liverpool Corporation...	„ 19	12,213	13,004	+ 791	7½	96,363	+ 7,663
Llandudno & Colwyn B.	„ 18	178	194	+ 16	11½	2,149	+ 156
London County Council	„ 9	46,816	44,255	— 2,561	45	1,997,098	— 4,516
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	„ 19	142	124	— 18	19½	2,606	— 823
Maidstone Corporation..	„ 17	148	171	+ 23	46	9,955	+ 499
Manchester Corp.....	„ 19	16,481	17,181	+ 700	46	829,547	+ 30,896
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	„ 19	158	193	+ 35	46½	9,080	+ 628
N'castle-on-Tyne Corp.	„ 19	5,611	5,662	+ 51	47	288,035	+ 28,679
Newport (Mon.) Corp....	„ 19	732	846	+ 114	47	39,469	+ 1,879
New St. Helens & Dist.	„ 16	799	886	+ 87	33	33,735	+ 3 403
Northampton Corp.....	„ 17	592	673	+ 81	46⅔	33,541	+ 5,745
Nottingham Corp.....	„ 17	3,112	3,583	+ 471	46	172,328	+ 13,760
Oldham Corporation ...	„ 6	2,001	2,148	+ 147	46	104,400	+ ...
Portsmouth Corp.....	„ 19	1,968	2,189	+ 221	47	114,552	...
Preston Corporation.....	„ 16	806	990	+ 184	46	45,165	+ 2,811
Provincial	„ 19	1,795	1,954	+ 159	20½	41,693	+ 3,226
Reading Corporation.....	„ 17	634	763	+ 129	46½	36,611	+ 4,034
Rhondda Tramways.....	„ 10	1,075	1,186	+ 111	6	7,016	+ 632
Rochdale Corporation...	„ 19	1,482	1,466	— 16	44½	78,836	+ 4,158
Rotherham Corp.....	„ 23	957	1,225	+ 268	47	55,805	+ 7,891
Salford Corporation.....	„ 21	4.694	5,041	+ 347	46	242,841	+ 11,624
Sheffield Corporation....	„ 20	8,133	9,501	+ 1,368	47¾	430,824	+ 61,285
Southampton Corp.....	„ 16	1,133	1,409	+ 276	46	69,257	+ 8,363
Southend-on-Sea Corp...	„ 16	570	564	— 6	46	36 757	— 7,960
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 12	670	722	+ 52	45⅔	36,081	+ 1,746
Sunderland Corp.....	„ 20	1,331	1,477	+ 146	47	70,502	+ 2,313
Sunderland District.....	„ 9	463	545	+ 82	15	8,509	+ 834
Swindon Corporation ...	„ 2	152	183	+ 31	44	8,728	+ 808
Torquay Tramways.....	„ 10	372	410	+ 38	6	2,520	+ 266
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	„ 16	493	489	— 4	7	3,388	+ 14
Wallasey Corporation ...	„ 19	1,035	1,106	+ 71	46⅔	58,915	+ 1,549
Walsall Corporation.....	„ 19	684	774	+ 90	8	5,903	+ 1,037
Walthamstow U.D.C....	„ 19	678	788	+ 110	47	41,123	+ 3,942
Warrington Corp.....	„ 17	412	496	+ 84	46	21,509	+ 1,404
West Ham Corporation	„ 17	2,659	3,005	+ 346	46½	142,856	+ 12,386
Wigan Corporation	„ 17	1,346	1,544	+ 198	46	70,139	+ 2,813
Wolverhampton Corp....	„ 23	967	1,083	+ 116	47	53,051	+ 3,562
Yorkshire (W. Riding)...	„ 20	1,399	1,515	+ 116	8	13,026	+ 1,754

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

LONDON ELECTRIC RAILWAYS.

Lord George Hamilton presided at the annual meeting of the Metropolitan District Railway on Thursday. In moving the adoption of the report, his lordship stated that the Company's proportion of the common fund under the pooling arrangement was 12 per cent. If for any cause the takings of any company should not be sufficient for such purposes, the deficiency would become first charge on the common fund. It would therefore be appreciated how very materially the position of the prior stocks of this company was improved by this agreement. The common fund for 1915 was no less than £451,000; in other words, the aggregate net earnings of the five companies must shrink by at least that amount before the interest on the prior stocks of the company could be affected, and this was a very unlikely contingency. In further remarks the Chairman alluded to the increase in the dividend for the year on the second preference stock from 2 per cent. to 3 per cent., and referring to the staff he stated that, generally speaking, the work which was being done by the women in the company's employ was satisfactory.—Sir Charles Dalrymple, Bart., seconded the motion.—Sir Robert Perks congratulated the management upon carrying such a large number of people—over 100,000,000, according to his estimate—during the past year, notwithstanding the undoubted difficulties which had had to be faced. The fact that the gross revenue now exceeded a million sterling seemed to mark a satisfactory step in the progress of the company. Ten years ago, when he last occupied the chair, they were looking forward to reaching that standard at a very much earlier date, and it had been a deep disappointment, he was sure, to all the ordinary stockholders, as well as to the Underground Company, which held so much of the preference stocks of this company, that they had had to wait so long for their anticipated return. To some extent this was due to the fact that they had not done what he, as Chairman, in the Parliamentary Committee-rooms assured Parliament they were going to do, and what they obtained Parliamentary authority to do—namely, charge a reasonable figure, instead of the "cut-throat" prices they at present charged to passengers. He hoped this question would be seriously considered by the Board.—In reply, the Chairman said he might fairly say that they were approximating nearer and nearer to the period at which the possibility of a dividend on the ordinary stock might become likely. Meantime the ordinary stockholder, by the making of a considerable reserve, was benefited at the expense of the second preference. All the estimates in connection with the electrification of the District Railway had proved too optimistic. The expenditure upon the electrification had been very much larger, and the receipts during the earlier years of the changed system of working very much less, than was anticipated. The railway had been resuscitated entirely by the exertions of Sir George Cibb, Sir Edgar Speyer, and Sir Albert Stanley—who had brought the railway up until there had been an absolute change in every way—in its material condition, in the service it rendered, and in its financial position. The policy adopted might be summed up in two sentences—namely, individual expansion inside and cohesion and unification outside. He wished to utter a word of warning on the question of fares. The District was now part of a great organisation which to a very large extent had control of the passenger traffic of London. In consequence of the District fitting into that organisation, its traffic had improved and its receipts had been augmented. They had to be very careful about raising fares, because if they raised them they would strike at the foundation of the success of the undertaking. They had arrived at their present position largely owing to the excellence and cheapness of the service. Looking, however, to the rise in the cost of petrol, coal, and wages, the time might come when in self-defence they would be compelled to raise their fares, but if they did this they would do it with the knowledge that the public knew they had been forced to do it.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended February 12, the latest period for which full returns are available, give total receipts of £172,150, or £17,733 more than in the corresponding week of last year. The total length of track was 2,292 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £75 2*s.* 2*d.* per mile of single track, and last year at the rate of £68 2*s.* 10*d.*, thus showing an increase for the week of £6 10*s.* 4*d.* per mile open.

DICK, KERR & Co.,

Limited,

ABCHURCH YARD, CANNON STREET, LONDON, E.C.

ENGINEERS & CONTRACTORS.

Complete Equipment

TRAMWAYS & LIGHT RAILWAYS

at home and abroad.

New Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS;

MEMBER INSTITUTION OF MECHANICAL ENGINEERS; MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND; MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS; MEMBER MUNICIPAL TRAMWAYS ASSOCIATION; FELLOW PERMANENT WAY INSTITUTION.

CONTENTS.

—:o:—

FOREWORD.

"What is wrong with the Track?"

CHAPTER I.—CONCRETE FOUNDATIONS.

Defects—Causes of fracture—Method of laying concrete.

CHAPTER II.—CONCRETE MATERIALS.

Road metal—Water gravel—Sand—Clinker sand—Trass.

CHAPTER III.—REPAIRS TO CONCRETE FOUNDATIONS.

Patching—Partial repairs.—Complete renewal.

CHAPTER IV.—TRACK DESIGN.

"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.

Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

CHAPTER VI.—RAIL LAYING.

Bad rail packing—Rails canted or twisted—Anchoring and padding—Rail expansion and contraction—Curving of rails—Springing of rails—Anchoring new tracks.

CHAPTER VII.—JOINTS, FISH PLATES, BOLTS AND NUTS.

Why joints fail—Dished or hammered joints—Movement at joints.

CHAPTER VIII.—JOINT WELDING.

Methods of welding—Thermit welding—Electric arc welding process—Expansion and contraction—Oxy-acetylene process.

CHAPTER IX.—RAIL WEAR.

At joints—On new tracks—On steep gradients—On wheel tyres—Contact of wheel and tyre—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.

Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

CHAPTER XI.—CORROSION OF TRAMWAY RAILS.

Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

CHAPTER XII.—TRACK PAVING.

Effect of vehicular traffic—Cause of loose rails—Importance of quality in sets—Square-dressed setts—Nidged granite setts—Bonawe granite setts—Wood paving—Bedding of setts—Laying and ramming.

CHAPTER XIII.—RECONSTRUCTION.

Removal of tracks—Temporary tracks.

CHAPTER XIV.—SURFACE DRAINAGE AND RAIL MAINTENANCE.

Rail cleaning—Rail grinding—Rail planing.

CHAPTER XV.—SPECIAL TRACK WORK.

Design and standardisation of points—Unbroken main line crossings—Renewable plates—Switches—Mechanism for movable points—Heel pins—Tongue heel adjusters—Guard rails—Spiral tables for curves and junctions—Special track problems.

250 pages, 10 × 6½ × 1 in., with over 150 illustrations.

Price 10s. 6d.

A WORK OF REFERENCE, INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 12. | LONDON, SATURDAY, MARCH 4, 1916. | [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid) - In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF EDINBURGH.

EDINBURGH CORPORATION ELECTRICITY SUPPLY.

NEW ELECTRIC GENERATING STATION, PORTOBELLO.

TO CONTRACTORS FOR STRUCTURAL STEEL WORK.

The Magistrates and Council are prepared to receive Tenders for the works required in the Erection of the Structural Steel Work at the new Electric Generating Station, Portobello, all in accordance with relative plans, specifications, and conditions of contract. Sir Alexander B. W. Kennedy, M.I.C.E., 17, Victoria Street, Westminster, S.W., Engineer; Mr. James A. Williamson, A.R.I.B.A., Public Works Office, City Chambers, Edinburgh, Architect.

Copies of the plans, specification, and schedule of quantities, forms of Tender, and all other particulars, may be had on personal application to the latter at his Office as above, on and after Monday, the 28th curt.

A deposit of £3 3s. (payable by crossed cheque only), is required for the plans, specifications, schedules, etc., and this will be returned to those who send in a bona-fide tender and return the papers complete.

Tenders, and also schedules of quantities, must be lodged with the subscriber, not later than 10 a.m. on Monday, March 13th enclosed in separate official envelopes, which will be supplied, sealed and marked outside "Tender for Structural Steel Work, New Electric Generating Station, Portobello," or "Schedule for Do." as the case may be.

The Town Council shall not be bound to accept the lowest or any Tender.

THOMAS HUNTER, W.S.,
Town Clerk.

City Chambers, Edinburgh.
February 23, 1916.

THE SOUTH INDIAN RAILWAY COMPANY, LIMITED,

Are prepared to receive Tenders for the supply of:

Quilon-Trivandrum Branch (Metre Gauge).

No. 1. 132 Pairs Steel Disc or Wrought Iron Spoke Wheels and Axles.

No. 2. 12 50ft. Bogie Carriage Underframes.

Specifications and Forms of Tender may be obtained at the Company's offices.

Tenders addressed to the Chairman and Directors of the South Indian Railway Co., Ltd., marked "Tender for Wheels and Axles," or as the case may be, must be left at the offices of the Company not later than one o'clock on Wednesday, March 15, 1916.

The Company is not bound to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 20s. for each copy of specifications.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M. Inst. C.E., Consulting Engineer to the Company, 3, Victoria Street, S.W.

91, York Street,
Westminster, S.W.,
March 1, 1916.

POSITIONS VACANT.

WALLASEY CORPORATION.

ELECTRICITY DEPARTMENT.

CHIEF ASSISTANT ENGINEER.

The Electricity Committee of the County Borough of Wallasey is prepared to consider applications for the position of Chief Assistant Engineer.

The salary will commence at £200 per annum, with Superannuation, Holidays, &c., as per the Council's scale.

Applications, with particulars of technical and practical training and experience, which must include mechanical, electrical and drawing office, with present occupation and age, to be delivered at the Town Hall, Wallasey (endorsed "Assistant Electrical Engineer"), addressed to the undersigned, not later than Saturday, March 11, 1916.

(By order) H. W. COOK,
Town Clerk.

Town Hall, Wallasey.
February 26, 1916.

BOROUGH OF RAWTENSTALL.

ELECTRICITY DEPARTMENT.

SHIFT ENGINEER.

The above Corporation invite applications for the post of Shift Engineer. Wages 42s. per week.

Applicants should have had experience in high-tension, three-phase, and direct-current three-wire system, and should also have had a good mechanical training.

A War Service Badge is attached to the position.

Applications, with copies of recent testimonials, and stating when able to commence duties, to be sent in not later than Tuesday, March 7, 1916.

C. L. E. STEWART, A.M.I.E.E.
Borough Electrical Engineer.

Bacup Road,
Rawtenstall.
March 1, 1916.

SHIFT ENGINEER.

Wanted, in Lighting and Traction Power Station, Shift Engineer to take charge during eight hours' shift. Experience with three-wire continuous supply essential.—Applications to be forwarded to Electrical Engineer, Electricity Works, Llandudno, stating age, enclosing copies of testimonials and salary required and when appointment can be taken up. Applicants eligible for the Army or on munition work will not be entertained.

INSPECTOR.

Inspector wanted, experienced in drivers' and conductors' duties; preferably accustomed to Westinghouse magnetic brake. Must be ineligible for military service. State age and experience.—Burton and Ashby Light Railway, Swadlincote.

DRAUGHTSMAN.

Wanted, for temporary engagement, a draughtsman to prepare plans, etc., for the construction of an Electricity Generating Station. Applications, stating age, experience, salary required, and when at liberty, accompanied by copies of two recent testimonials, to be addressed to the Borough Electrical Engineer, Eccles Corporation Electricity Works, Cawdor Street, Patricroft, Lancs.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION

AND

MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,

AMBERLEY HOUSE, NORFOLK STREET, LONDON W.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MARCH 4th, 1916.

WEST HAM AND WALTHAMSTOW FARES.

The West Ham Borough Council still hesitate to take the step that will enable their tramways to avoid carrying 47 per cent. of the passengers at the loss entailed by halfpenny fares. Mr. Moffet, the general manager, has shown that during the last two years the receipts from halfpenny fares represented but 28 per cent. of the total revenue, and involved losses of £14,200 and £20,000 respectively, excluding the capital charges. While last year the receipts from penny and higher fares made good the deficiency, in the previous year a little over half of the loss was borne by the rates, £4,000 by the reserve fund, and £6,000 by the higher fares. To continue to conduct the undertaking on such lines is folly, but there is evidently a method in the madness of some of the councillors who were responsible for the rejection of the Tramways Committee's proposals by 29 votes to 15, and the decision to further consider the matter in committee. A railway worker exclaimed: "Free travelling; that is what we want." Another declared that he and his friends were doing all they could to get the cars run free, and that his party sent men to the Council to act as they were told. These gentlemen, while asserting that the Council had something more to study than the reputations of tramway managers, failed to show that their plan of relying on the public purse is preferable to the manager's proposal for rendering the undertaking self-supporting. At a period like the present his socialistic critics are in danger of exhausting the patience of the ratepayers, who will not care to continue to meet the increased deficit that may be anticipated on the present fares now that the cost of materials and labour has greatly advanced. Moreover, there is a danger of the people who have voted for Socialists finding themselves hoisted with their own petard. This class of voter generally prides himself that he does not pay rates, forgetting that his payment is made through the higher rents that Londoners are charged when the property owner pays the rates. The recent Rents Restriction Act, which was passed to stop property owners from increasing rents, provides a means of preventing the whole burden of increased rates being borne by landlords. Under that measure the increase can be levied upon the tenants. This consideration should be borne in mind during the Council's deliberations, especially as the manager has warned them that the cost of new trackwork requiring to be put in hand amounts to £100,000. The Tramway Committee's suggestions are eminently suitable for a restricted area such as West Ham. While abolishing the unremunerative halfpenny charge, the institution of a universal penny fare for a continuous journey on any one car is likely to secure additional traffic. For workmen a three-halfpenny return fare by one car each way is proposed, while children's fares remain unaltered and existing through fares where necessary would be adjusted. After some months of discussion the members of Walthamstow Council have arrived at a decision that will tend to a solution of their troubles. On the recommendation of the manager, a new list of fares and stages has been accepted in which the lowest charge is a penny, except for children. Workmen's fares are to be increased by 50 per cent. Hitherto workpeople have been given fares that were greatly below the limits fixed by the Board of Trade. Councillor Lyne, Chairman of the Tramways Committee, challenged the right of a municipal authority to budget for a loss, and then call upon the ratepayers to meet it. In the latest Acts of public utility undertakings there is the provision that in the preparation of estimates the receipts should meet the expenditure. Amongst tramways the Belfast Act affords an instance of such a requirement. We are glad to observe, too, that Mr. Moffett has not hesitated to urge the adoption of fares that give the journey desired at not less than cost price, and that the scale should be periodically revised in accordance with the requirements of the financial side of the undertaking. Why should tramways be an exception to electric supply and other business undertakings?

THE SUPPLY OF TICKETS.

The secretary of the Tramways and Light Railways Association has addressed a communication to the Board of Trade upon the subject of the limitation in the production of the tramway and omnibus tickets, owing to the restriction in the importation of wood pulp. In addition to the association of which he is secretary, Mr. A. de Turckheim stated that his letter was forwarded on behalf of the London Omnibus Owners' Federation, the British Electrical Federation, and the Provincial Omnibus Owners' Association. The letter stated:—

"It has been represented to us by the manufacturers that a very serious position will arise owing to the difficulty in obtaining the necessary ticket material. If, as we understand, consumers are only to be allowed to purchase one half of their normal consumption, the working of all passenger transport will be gravely disorganised. I am to call your attention to the fact that the regular conveyance of munition workers to and from the factories in which they are employed now forms no small part of the business of the various undertakings which we represent, and I am respectfully to urge on their behalf that instructions may be given with a view to licences being granted which will ensure to them the full amount of their normal consumption of tickets as heretofore. I am further instructed to ask whether your honourable Board will be pleased to receive a deputation representing the above bodies at an early date, in order that they may be given an opportunity of laying their views before you upon this important matter."

PETROGRAD TRAMWAY CRISIS.

The Petrograd electric tramways undertaking is threatened with paralysis; in fact, it is stated in the Petrograd press that quite sixty per cent. of the cars are not now running, for one reason or another, including want of repairs and shortage of fuel at the power station, but generally for want of efficient maintenance. Various engineering shops in the country have cars ready for delivery to supplement those that are running, but owing to the unfortunate interruption on the Russian railways generally, it has been found impossible to deliver these cars to Petrograd. The consequence is, that the cars now running are besieged by crowds at all the stations, and are crowded to "suffocation"; whilst it is made impossible for the conductors to collect the fares. The scandal, for so it is called, has been brought before Petrograd Town Council, but it has been found impossible to hold anybody answerable for the confusion so caused. According to the newspapers, it appears to be nobody's business now to manage the tramways. The resignation just announced of the Town Governor has not contributed to simplify the many problems, including the tramway difficulties, that confront the authorities.

Digitized by Google

TRAMWAYS UNDER MUNITIONS OF WAR ACTS.

The following form (M.M.I.) has now been issued, and may be obtained by application to the Ministry of Munitions :—

Application to the Minister of Munitions to certify, in accordance with Section 9 (1) (d) of the Munitions of War (Amendment) Act, 1916, that the supply of tramway facilities by the undermentioned undertaking is of importance for the purpose of carrying on munitions work.

(1) Title and address of undertaking making application.
(2) Route mileage of the system.
(3) Total number of cars in service on an average weekday.
(4) Number of such cars (if any) which are necessary and used for the carrying of workpeople.
(5) Total number of cars in service on Saturdays.
(6) Total number of passengers carried on an average weekday.
(7) Average number of workpeople carried on an average weekday.
(8) Any estimate available for the number of munition workers included under (7).
(9) Average number of passengers carried on Saturdays.

NOTE.—The answers to questions (3) and (9) should be based pon the figures of the present period of the year.

(10) Number of tramway employees affected by the application.

Traffic Staff—
1. Drivers.
2. Conductors.
(a) Male.
(b) Female.
3. Other traffic employees.

Car Repair Shops—
1. Skilled men.
2. Semi-skilled men.
3. Labourers.

Permanent Way—
1. Skilled men.
2. Semi-skilled men.
3. Labourers.

Power Station—
(If the tramways undertaking supplies its own power).
1. Skilled men.
2. Semi-skilled men.
3. Labourers.

Car Sheds—
1. Skilled men.
2. Semi-skilled men.
3. Unskilled (a) men.
(b) women.

Electrical Equipment—
(Linesmen, etc.).
1. Skilled men.
2. Semi-skilled men.
3. Labourers.

(11) Is it claimed that the whole of the tramway routes are used by and are necessary for the carrying of munition workers to and from their work ?
If not, state what portion of the tramway routes it is claimed should be certified.

(12) Is it claimed that the whole of the cars in daily service (including Saturdays) are necessary for carrying munition workers to and from their work ?
If not, state how many cars it is claimed are necessary.

(13) A map should be sent showing by distinctive colour—
(a) The tramway system which, it is claimed, should be certified.
(b) The principal munition factories directly served by the undertaking.

(14) Give a list of the principal munition factories served directly by the undertaking. (This should correspond, as far as possible, with those shown on the map referred to in the previous question, and should be made out overleaf.)

Signed on behalf of .....
Signature.....
Date.....

List of principal munitions factories served.

Signed on behalf of.....
Signature.....
Date.....

APPLICATIONS UNDER THE ACT.

Glasgow Tramways Committee have recommended that application be made to the Ministry of Munitions for the Department to be placed under the Munitions Act so far as employees and supplies are concerned.

Bolton Tramways Committee have applied to the Minister of Munitions for his certificate, in accordance with the Munitions of War (Amending) Act, 1916, that the supply of tramway facilities is of importance for the purpose of carrying on munition work.

Halifax Council on March 2 agreed to authorise application to the Minister of Munitions for the Tramways and Electricity Departments to be taken over as controlled establishments. Alderman C. F. Spencer, chairman of the Committee, explained that difficulties were being experienced in the Tramways Department in regard to labour. At present any man employed in the engineering department could leave whenever he wished to do so. If cars could not be kept in repair, they could not be kept running. If the departments were made controlled establishments there would be a possibility of the Committee retaining labour, or of getting a supply from other establishments.

RUSSIAN TRAMWAY REQUIREMENTS.

NEW CARS, TRAILERS, AND WORKSHOPS FOR MOSCOW.

Moscow Town Council will shortly consider a proposal to add to their tramways rolling stock and an extension of the system. New workshops are to be built, and the total cost is expected to exceed one million roubles (£106,250). The Town Executive Committee proposes that the Council should buy American cars on easy terms, i.e., on the instalment plan—to the extent of 100 motor cars, and 150 trailers.

MISCELLANEOUS NEWS AND NOTES.

Air Raid Insurance.—Bradford Tramways Committee have decided to effect insurance of certain property against air raids.

Trade Union Badges.—Bolton Tramways Committee have deferred until after the war consideration of their employees' request to be allowed to wear trade union badges whilst on duty.

South Shields Tramways.—The estimates of South Shields Corporation for the next half-year show a reduction of 5*d.* in the borough rate. A sum of £2,400 is expected as a contribution from the tramways undertaking.

Henley Motor Tires.—A reminder of the pneumatic and solid rubber tires made by W. T. Henley's Telegraph Works Company, 18, New Union Street, Moorfields, E.C., is given by the issue of several picturesque blotters. Sets of these can be obtained on application.

The Lifting Height of Jacks.—At an inquest held on a woman who was run over, during darkness, by an Oldham tramcar, a witness stated that the jacks carried on the car failed to raise it high enough to enable the men to release the body.

A New Clydebank Bridge.—The new swing bridge over the Forth and Clyde Canal, erected by Glasgow Corporation, has been opened for traffic. Its erection was decided upon with a view to extending the tramways to the north of Clydebank.

Railway Craftsmen's Wages.—A claim has been submitted to the railway companies for a supplementary advance in wages to craftsmen to bring up the war increases to 5*s.* per week on time rates and 12½ per cent. on piece rates.

Bradford and the Rentention of Conductors.—Bradford Tramways Committee have passed the following resolution : "That having regard to the severe gradients on certain sections of the Bradford Tramways system the committee deem it necessary, in the interests of public safety, that not less than one-third of the staff of male conductors be retained in the service of the department."

Refusal of Total Exemption.—Mr. W. G. Hardy, manager of Bath Tramways Company, applied to the Local Tribunal for the retention of three employees—stokers and a trimmer. Only three month's exemption was granted. A motorman, for whom the manager did not appeal, was allowed a month.

Light Railways Order.—The Board of Trade have confirmed the undermentioned Order made by the Light Railway Commissioners : South Yorks Joint Line (Firbeck Light Railway) Order, 1916, authorising the construction of a light railway in the West Riding of the County of York and in the County of Nottingham.

N.S.W. Tramways Project.—A scheme is under consideration by the New South Wales Works Department to extend the tramways in the vicinity of Sydney by constructing lines from Bondi Road to Bronte, along Cook's River Road to connect with Gardener's Road line, and from Burns Road to Ryde. The estimate cost is £164,000.

Eccles Council Tramways.—This undertaking, which is worked by Salford Corporation Tramways Department, has received a sum of £2,220 as the surplus for the year ended March 31. The Council have allotted £572 for street improvements, and £1,647 to the reserve fund.

Tramways and Munitions of War Act.—The Law Committee of the Association of Municipal Corporations have reported to the Council of the Association that through their intervention the carrying on of tramways had been defined as munitions work for the purposes of the Munitions of War Acts.

100-Ton Floating Crane.—The Port of London Authority have decided that a floating crane with a lifting capacity of 100 tons shall be added to the equipment of the Royal Albert and Victoria Docks. The crane will also be available for use in most of the other Docks of the Authority.

The Institution of Automobile Engineers.—The next meeting will be held on Wednesday, March 8, at the Royal Society of Arts, John Street, Adelphi, W.C., at 8 p.m., when Mr. J. Lawrence Hodgson, B.Sc., A.M.Inst.C.E., will read a paper entitled "The Fan Dynamometer." Cards of invitation may be obtained on application to the Secretary, I.A.E., 28, Victoria Street, London, S.W.

Preservation of Wood Block Paving.—At the Chicago Convention of the American Wood Preservers' Association, consideration was given to two reports dealing with wood-block preservation specifications. It was contended that practically all oils gave equally good protection against decay. Both reports were referred back to Committee.

Request for Queues and More Ventilation.—Sedgley Council have called the attention of the Tramways Company to the following matters : The entire absence of any queue system for boarding the cars ; the lack of proper and adequate means of ventilation ; the provision of a special car to convey miners from Sedgley to Dudley at times to suit the shifts.

Public Utility Officers and Exemption.—In a report presented at a meeting of the Council of Municipal Corporations, the Law Committee reported that under the Military Service Act the question of exempting officials on the administrative and technical staffs would be primarily one that the local authority would settle with the military representative at the local tribunal.

Pontefract Collision Arbitration.—During the last statute fair at Pontefract, which is held in the streets, a tramcar belonging to Wakefield and District Light Railway Company collided with a cinematograph show, whose owner claimed £488 damages at the subsequent arbitration proceedings. The arbitrator, Mr. C. Orton, of Burton-on-Trent, has awarded a sum of £286 10*s.*

Dundee Parcels Traffic.—The Tramways Committee have increased the parcels rates in order to secure an increased revenue of £330 per annum to cover the higher wages of the boys who deliver the parcels. In place of 7 lbs. for a penny, 14 lbs. 2*d.* and 28 lbs. 3*d.*, the rates are to be 1 lb. 1*d.*, up to 7 lbs. 2*d.*, between 7 and 14 lbs. 3*d.*, between 14 and 21 lbs. 4*d.*, and between 21 and 28 lbs. 5*d.*

Digitized by Google

War Concession Withdrawn.—On January 31 all free riding privileges granted at Huddersfield in connection with the war were withdrawn, except to regular members of the Forces, including wounded men. In order to facilitate the dinner hour traffic, Councillor Sellers, chairman of the Tramways Committee, has appealed to ladies to do their shopping before 12.30 or after 2 o'clock.

Necessity for Snow Ploughs.—London was threatened with another fall of snow on Monday night, but, fortunately, it turned to rain. The question arises whether the County Council would not be well advised to invest in proper snow ploughs, rather than incur the dislocation of traffic witnessed on February 24. On the conduit lines the trouble is increased by the scattering of salt by borough council roadmen, the resulting mixture in the conduit giving rise to arcing and burning of the insulation of the power collector.

Linking up of London Electricity Works.—The Board of Trade have approved of the proposed agreement for the linking up of the power stations belonging to Hackney and Poplar Borough Councils. A scheme for linking up the Poplar and West Ham stations has also been approved, and West Ham Council have been recommended to apply for sanction to borrow £4,500 to defray their share of the cost. A sum of £23,000 is also proposed to be expended by West Ham for the extension of machinery and mains to meet the demands for power.

Newcastle Extensions.—By the opening on February 25 of an extension of the Corporation Tramways from Heaton to Longbenton, direct communication has been provided with the city. From Longbenton there is a motor omnibus service to Annitsford and other places. A further extension to Forest Hall Railway Station has been partly carried out, and it has also been decided to put down a line from Longbenton, over the Blyth and Tyne Railway to the north, with a view to securing a second service from the city to Gosforth Park.

American Electric Railway Statistics.—From the electric railway directory of the McGraw Publishing Company, of New York, which has recently been issued, it appears that there are now in the United States 46,454 miles of electric railway and tramway track, owned by 1,027 companies. The total number of cars is 99,405, as compared with 97,721 last year. There are also 512 electric locomotives and 538 electric goods cars. In addition 3,048 trailer cars are used in electric railway service. The cable and horse cars have decreased to 380.

Tramways Competition with Dublin Railways.—At the annual meeting of the Dublin and South-Eastern Railway Company, Mr. W. F. Pim (chairman), said that the magnitude and the permanence of the loss inflicted on the railway by the tramway competition had never been properly realised. Comparing the five years 1910-1914 with 1890-1894, the last five before the electrification of the Dalkey tramways, the average yearly passenger receipts of the railway between Westland Row and Dalkey had been reduced from £86,984 to £46,573.

Metropolitan Tramways Company's Bill.—Tottenham Urban Council have received the approval of the Local Government Board to their resolution to oppose in Parliament the Metropolitan Electric Tramways Company's Bill, and a petition has accordingly been lodged. The objects of the Bill are (1) to relieve, until three years after the war, the County Council "from all liability to proceed or to be compelled to proceed" with the tramways and widenings authorised in 1911; (2) to postpone until the same period the time granted in 1913 for erecting railless trolley vehicle equipment in Wood Green and Tottenham from Green Lanes to Ferry Lane.

Oldham and the Lighting Restrictions.—In response to the police demand further restrictions of the lighting of the Oldham cars is being made. The manager started to use the shades approved of in Manchester, and also those of another pattern. On receiving information that the orders could not be delivered for a fortnight, Mr. Dugdale secured some shades similar to those used at Ashton, but he does not consider these to be so satisfactory. Subsequently he took out a section of the lamps in each car, and dipped the others in varnish. If the police require a further diminution he is prepared to comply with the request.

Government Aid for Trade.—At a luncheon in connection with the conference of Chambers of Commerce, held in London on February 29, the Chancellor of the Exchequer said: "It does not follow, though trade may be free, that the help of the Government should not be given to assist our traders, and we are prepared, and we have already shown in a way which I am not yet able to state to you that we are prepared to give the assistance of the Government to the development of foreign trade, in order to ensure that those rivals, now our bitter enemies, shall not have the control of the foreign trade which they have enjoyed in the past."

Tramways Stoppage at Birmingham and Walsall.—Coal stocks at the power station having been practically exhausted because of the adverse weather interfering with the transport arrangements, the Birmingham tramways service was suspended for an hour during the afternoon of February 28. This is the second occasion that such a course has had to be adopted in order to conserve power for munition works. Walsall Corporation tramway service had to be temporarily suspended for an hour and half during the morning of February 29. The supply of fuel available for the use of the Electricity Department had run short in consequence of the bad weather recently experienced.

Overseas Tramways and Double Income Tax.—An influential meeting held on February 28 at the Cannon Street Hotel, E.C., passed the following resolution: "That, in the interests of Imperial trade and commerce, and of the unity of the Empire, it is essential that such steps should be taken by the British Government as will enable immediate relief to be given from the imposition of double income-tax within the Empire." It was supported by several Agents-General for the Colonies. As the Chancellor of the Exchequer has also been requested to receive a deputation on the subject, he is likely to learn that the matter affects the Empire and not only the Bombay Tramways Company, whose representations on the subject he recently treated in a very cold manner.

Conductor's Claim for Air Raid Injury.—In a Metropolitan County Court on February 28, a conductor in the employ of the London General Omnibus Company applied for an award under the Workmen's Compensation Act, in respect to injuries received in the airship raid on September 8. One of three airships dropped a bomb in front of an omnibus, killing the driver and eight passengers, and injuring the conductor. In refusing the application, the judge said he did not think that the nature of the man's duties prevented him from taking cover and performing his contract of service. He held that the applicant was exposed to no more risk than any of the passengers. He thought that the case was not so strong as that of Cooper v. North Eastern Railway Company, which was one where an engine driver had taken shelter.

Police Procedure Restrained.—It is a generally accepted rule that police court proceedings should not be heard so as to prejudice the hearing of a civil action when such is pending. At Clerkenwell, recently, a Metropolitan Tramways Company's motorman was summoned for failing to bring his car to a standstill when necessary to avoid impending danger, in Caledonian Road. The car ran into a coal van, which came from a side street. Mr. d'Eyncourt said that as a civil action was going to be brought, he would adjourn the case. A police-inspector said that the Commissioners considered that criminal proceedings should take precedence. Mr. d'Eyncourt: "I am aware of that, but what I am dealing with is only a subsidiary matter, and I consider that is good reason for postponing it until the civil case is heard."

The Municipal Tramways Association.—The annual proceedings for the year 1914-15 (132 pp., 9¾ in. × 6 in.) are now available, and may be obtained from the Hon. Secretary, Mr. C. J. Spencer, Tramways Department, 7, Hall Ings, Bradford (price, 5s.). The volume contains a full report of the annual conference held in London, in September last, at which papers of considerable interest to tramway operators were read. In addition to other useful matter, full information is given, in a return from a large number of corporation tramways, as to war bonuses, allowances and the number of men who have joined His Majesty's forces; and a detailed index of the proceedings since the inauguration of the Association in 1902, which will be found very convenient for reference, completes an excellent record of the Association year. Applications for back numbers of the reports should be made to the Hon. Secretary.

The Capital Outlay for Women Conductors.—In opposing a motion at a meeting of Leeds Corporation on March 1, that the terms of employment for female conductors be the same as for men, Alderman R. A. Smithson, chairman of the Tramways Committee, agreed that women had filled their place on the cars admirably. On the average they were drawing about 27s. 6d. per week, and were earning more as a start than the men were in pre-war times. The whole basis of the employment of women was entered into in an agreement with the representatives of the men's labour, and it was a temporary employment. So far as his experience went, the women were satisfied with their pay. The department were not making money out of them. To recoup themselves for the capital outlay and expenditure rendered necessary by the conditions of employment they would need to retain their services for some years.

Rent of Leased Lines.—At the annual meeting of Blackpool and Fleetwood Tramroad Company, Mr. J. Greenwood, of Manchester, the Chairman, stated that the company paid the Corporation £1,000 a year for a mile and a half of line leased from them; and they were open to negotiate for an extension of the lines at a higher rate than they now paid. The directors were also willing to make a reasonable contribution to the sea wall at Bispham and certain expenses which might arise in constructing the tramways. The rent paid was equal to £676 per mile per annum. In Manchester, the old Carriage Company, who held the lease of tramways from the Corporation for a long period, did not pay more than £450 per mile, with the exception of Market Street, which, owing to the fact of two outside districts running through that thoroughfare, measured as being double. But Dickson Road, Blackpool, was not Market Street, Manchester.

Industrial Commissioner and Croydon Employees.—Croydon Tramways Committee recently received a letter from the Chief Industrial Commissioner enclosing copy of a letter received from the London and Provincial Union of Licensed Vehicle Workers respecting an application by the Corporation Tramways employees in regard to wages and working conditions. The Commissioner asked for the observations of the Corporation thereon and whether they were willing to concur in the reference of the matter to arbitration. The Tramways Committee have since reported to the Council that they had received a deputation from the Union, and that if the requests were complied with it would involve an additional payment in wages, etc., amounting to approximately £10,000 per annum. The Committee had informed the Union that, except for the granting of a few minor requests, they were unable to comply further with the application. The Committee recommended that the Chief Industrial Commissioner be informed that the Corporation were not willing to concur in the reference of the matter to arbitration. The Corporation have endorsed the recommendation. It was stated by Alderman Allen, Chairman of the Tramways Committee, that the Committee was paying £4,955 in war allowances and £930 in war bonuses, whilst the request of the Union would involve an additional expenditure of over £10,000, or a 2½d. rate. He did

Digitized by Google

not believe the threat made by a councillor that there would be trouble. The men had always been satisfied, and there had been no trouble in Croydon with the tramway authorities and their men. The manager did all he could to work the undertaking as fairly and as justly as he could to all the employees, and they would find plenty of men who would uphold the manager.

PERSONAL.

Gunner J. Mankinney, R.F.A., formerly a West Hartlepool motorman, has been awarded the D.C.M. for bravery at Loos.

The Late Mr. Thomas Parker, who designed the Liverpool Overhead Electric Railway, and was a director of the Metropolitan Railway, left estate valued at £13,380.

Mr. F. W. McLean, formerly district engineer in Dunedin, has been appointed chief engineer of the New Zealand Government Railways. In 1878 Mr. McLean took first-class honours in engineering at Edinburgh University.

Mr. P. P. Wheelwright, electrical engineer to Blackburn Electricity Works and Tramways, has been recommended by the Electricity Committee for an increase of £100 per annum in his salary, in order to bring his remuneration up to the level of salaries paid to other officials of similar standing.

Inspector W. Taylor, of the Leeds Corporation Tramways, has an unbroken connection of forty-two years with the city tramways. This fact was mentioned by Mr. J. B. Hamilton, the general manager, in a lecture that he delivered on "The Romance of Leeds Tramways," on Feb. 25, at the Philosophical Hall.

Mr. H. H. Gordon will be nominated by the Progressives for the deputy-chairmanship of the London County Council. Mr. Gordon has made a study of tramway undertakings on the Continent. He is an engineer by profession, has held positions on the Indian Railways and on the Great Western Railway, and has represented Whitechapel for twelve years.

Lieutenant J. Smith, Swansea Tramways Company, has for some time been serving in France with the 1st South Wales Borderers. In a letter to the "Record" of the B.E.F. Mutual Aid Fund, he says: "We have a number of London 'buses, used for carrying troops some distance up the line. I always am reminded of tramways and transport, and when I happen to be near a French mine I usually visit the engine-room—one does appreciate a change."

Major F. J. Chapple, power and rolling stock superintendent, Potteries Electric Traction Company, has been mentioned in despatches by Lord French of Ypres, for services with the North Midland Heavy Battery at the Western Front. The gallant officer joined the battery on its formation and went to France in February last. The battery has seen a great deal of service, and during the indisposition of the Colonel the command fell to Major Chapple. He has been associated with the Potteries Company for the past fourteen years.

Mr. C. W. Shepherd, who recently resigned the position of general manager of the Edinburgh and District Tramways Company, has, at the request of the directors, retained the position of secretary. At the annual meeting the chairman said he regretted that Mr. Shepherd had found it necessary, owing to indifferent health, to resign his position as general manager. He had been a tremendous asset to the company, and the board were glad that they had been able to retain his services as secretary. They had appointed as general manager and engineer, Mr. J. D. R. Cox, who had shown great aptitude for the work. Mr. Edward Lafferty, who had had large experience at Preston, had been appointed traffic manager.

Mr. Andrew Nance is to retire from the general management of the Belfast Corporation Tramways, and the City Council have appointed him consulting engineer to the tramways at a salary of £500 per annum. Mr. Nance was for many years general manager of the Belfast and District Tramways Company, which was one of the most successful tramway undertakings in the country. When the Corporation purchased the undertaking, in 1904, Mr. Nance was appointed general manager, and it was under his supervision that the system was electrified and extended. Since then considerable sums have been paid by the undertaking in relief of rates, while a reserve fund of £20,000 has been accumulated, and payments made to the sinking fund amounting to £260,500.

CONTRACTS AND ORDERS.

British Westinghouse Company have received the contract for switchgear required for linking up Poplar Electricity Works with those of the Hackney Council. The amount of the tender was £1,498.

Ilford Council have allotted a contract to Messrs Foster & Co., for the supply of 5,400 tons of Ibstock medium peas coal at 20*s.* 2*d.* per ton, and 1,500 tons each of Ibstock D.S. nuts and slack at an average price of 18*s.* 0½*d.* per ton, over a period of twelve months.

Coal for Power Stations.—Myers, Rose and Company have received a contract for supplying fifty tons of coal per week, for a period of twelve months, to the electricity works of Walthamstow Council. For supplying coal for two years to Southend Electricity Works the contract went to Foster and Company.

Material for Car Maintenance.—Mr. G. R. Spurr, engineer to Walthamstow Tramways, having reported to the Committee as to the difficulty of obtaining materials for the maintenance of the cars, the Committee have recommended that he should obtain prices for the supply of commutators and axles.

The Victorian Government Railways have placed a contract with Messrs. Stothert & Pitt for two 50-ton electric overhead travelling cranes, etc., for the Ballarat and Bendigo workshops, at £2,100 each; 30-ton electric overhead crane for Ballarat workshops, £1,575; and two 10-ton electric overhead cranes for Bendigo and Ballarat workshops, at £937 each.

The Mirrlees Watson Company recently received the following orders for condensing plant:—Manchester Co-operative Society, Ltd., Lanarkshire Steel Company, Joseph Crosfield and Sons, Ltd., Warrington (two sets), Powell Duffryn Steam Coal Company (two sets), Steel Company of Scotland (three sets), Frodingham Iron and Steel Company, David Colville and Son, Ltd., Motherwell, Stanley and Mapperley Collieries, Digby Colliery Company, Moira Colliery Company, and Nobel's Explosives Company, Ltd.; also a number of separate condensers and air pumps for various munition works and for France and Russia.

Contract for Rails.—In reply to an invitation to rail manufacturers to tender for supplying 600 tons, or any less quantity of tramway rails, for the purpose of doubling the Connaught Road tramways, West Ham Tramways Committee received an offer of 100 tons at £13 per ton. This has been accepted, subject to the sanction of the Board of Trade. The Beckton Road tramway being unproductive, the Committee have adopted the suggestion of Mr. J. S. D. Moffet, general manager, that the rails be pulled up and used for doubling the track at Connaught Road. The cost of the doubling is estimated at £970, and of pulling up the rails and restoring the roadway £350. The value of the rails, etc., recoverable, is put at £2,000.

FINANCIAL REPORTS AND MEETINGS.

Mumbles Railway and Pier Company.—Mr. T. J. Williams, M.P., in moving the adoption of the report at the annual meeting recently said the undertaking was leased to the Swansea Improvements and Tramways Company for 999 years, and that under the agreement certain sums were paid, increasing every year, which now amounted to £13,900. This was sufficient to guarantee a dividend of 7½ per cent. on the ordinary shares, besides the 4 per cent. preference dividend and the covering of working and incidental expenses.

Mexico Tramways Group.—A committee, headed by Mr. E. R. Peacock, and including several prominent City men, has been formed to watch over the interests of the bondholders of the Mexico Tramways Company, Mexican Light and Power Company, Mexican Electric Light Company, and the Pachuca Light and Power Company. In an appeal to the bondholders to deposit their bonds on behalf of the committee it is stated that the committee, in co-operation with the trustees and the directors, are endeavouring to secure such guarantees as will ensure that the property when taken back can be worked with proper protection and under such conditions as will safeguard the bondholders' interests. The tramways are still operated by the military authorities—it is believed at a heavy loss—and the physical condition of the property has steadily deteriorated. Lately, Señor Carranza has signified his intention of restoring the management to the company.

The Lancashire United Tramways, Limited.—The ordinary general meeting was held at Winchester House, London, E.C., on February 29. The Hon. Arthur Stanley, M.P., chairman of the company, presided, and in moving the adoption of the accounts for 1915 he referred to the satisfactory result of the working for the year, notwithstanding the increase in expenditure caused mainly by the extra cost of materials, war bonuses to employees, and amounts paid to dependants of men who have joined His Majesty's Forces. 130 men are serving with the Colours, but up to the present the usual service of cars had been maintained through the employment of female labour, which was proving satisfactory. The Chairman referred to the fact that since the early days of the war the staff and employees of the company have made a regular monthly contribution to the funds of the British Red Cross Society. These contributions have averaged over £25 per month, and amount in all to over £360. Mr. Stanley (who is chairman of the Joint War Committee of the British Red Cross Society and the Order of St. John of Jerusalem in England) took the opportunity of publicly thanking all who had thus generously helped in the work of transporting the sick and wounded.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended February 19, the latest period for which full returns are available, give total receipts of £172,478, or £15,406 more than in the corresponding week of last year. The total length of track was 2,289 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £75 5*s.* per mile of single track, and last year at the rate of £60 5*s.* 7*d.*, thus showing an increase for the week of £5 19*s.* 5*d.* per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Mar. 2.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	67	67
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	81/7½	81/3
4%	4%	Do. 4% Deb. ...	100	91	72½	72½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74¾	74
5%	5%	Do. 5% Deb. ...	100	96	77½	78
7d.	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	19/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92½	92¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10	10
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97	98
$¼	$¼	Brazilian Trac. & Power Ord. ...	$100	66	50½	51½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	90	90
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅜	6 5/32
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	35½	36
5%	5%	Do. 5% Cum. Pref.	100	103	53¾	57½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	64½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	73½	75½
70/-	70/-*	Do. 7% Pref.	100	55½	45½	47¾
—	—	Do. 6% Pref. Ord.	100	17½	15½	15¾
—	—	Do. Def. Ord.	100	11	10½	9¾
5%	5%	Do. 5% Deb.	100	92	82¾	82¾
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	68	66
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87½	87½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¼	6/0/9	6
1/3	1/3	City of B.A. Trams.	5	5½	92/6xd	92/6xd
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	86	86
6/-	6/-	Dublin United Trys 6% Pref.	10	12	11 3/16	11 3/16
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	10 1/16xd	10 1/16xd
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord....	1	—	9/10½xd	9/10½xd
—	1½d.	Lond. & Sub. Traction Ord. ...	1	19/32	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	9/16	9/1½	9/1½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	55½	55½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	80	83¾
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	74	75½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78½	78½
$1¾	$1¾	Mexico Trams. Common ...	$100	70	42	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	39¾	40
6%	6%	Do. 6% Mt. Bds.	100	76	35½	39¼
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	94½
1/2*	1/2⅜*	National Steam Car	1	15/32	11/3	11/6
9⅜d.*	9⅜d.*	New General Traction	1	7/8	7/9	7/9
1/2⅜	6d.	Northern Gen. Trans. Ord. ...	1	9/16	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	59/8	58/-
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/1½	10/1½
8d.	10d.	Provincial Trams. Ord.... ...	1	⅝	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	88¼	88
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74	73
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89	89
5%	5%	Do. 5% Perp. Deb.	100	99½	77¼xd	77¾xd
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94xd	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76½	76½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Increase or Dec.
Anglo-Argentine	Feb. 25	£50,712	£48,957	8	£395,241	— £7,666
Auckland (28 days)	Jan. 14	22,164	22,868	28	148,708	+ 1,612
Ballarat and Bendigo ...	Jan. 2	4,439	4,438	40	32,932	— 2,772
Brazilian Traction Mlrs.	Dec.	6,010,490	6,527,000	52	77,113,110	+3,761,632
Brisbane	Jan.	29,620	32,280	4	32,280	+ 2,660
British Columbia.....$	Dec.	674,063	603,667	26	3,240,146	— 758,753
Buenos Aires Lacroze ...	Jan. 7	43,301	40,596	30	291,525	— 4,741
Burmah Tramway ... Rs.	Feb. 26	3,466	3,315	...	...	+ 6,658
Calcutta.....Rs.	,, 26	64,281	66,877	8	552,951	+ 27,573
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias..	Jan.	904	2,841	4	2,841	+ 1,937
Cordoba	Dec.	12,091	13,025	34	124,148	+ 4,718
East India	Jan.	1,914	2,015	26	12,531	+ 650
Hong Kong .....$	Jan. 29	9,506	11,393	8	55,291	+ 6,977
Kalgoorlie	Dec.	2,905	3,018	52	33,420	+ 1,596
La Plata	Jan.	4,540	4,533	4	4,533	— 7
Lima	Jan.	33,043	34,014	4	34,014	+ 971
Lisbon .....Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks).....Rs.	Feb. 15	27,430	29,860	6	96,243	+ 11,427
Manila .....$	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Dec.	...	72,658	...	...	...
Mexico .....$	*	...	...	...	...	...
Montevideo	Jan.	32,459	34,252	13	93,964	+ 5,818
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai .....$	Feb. 2	22,897	23,680	...	...	...
Singapore .....$	Jan. 22	9,900	11,804	3	35,609	+ 6,038
~~Toronto.....$~~	~~Nov.~~	~~824,634~~	~~851,113~~	~~48~~	~~8,793,719~~	~~— 502,658~~
~~Winnipeg .....~~	~~Dec.~~	~~368,400~~	~~377,121~~	~~52~~	~~3,499,741~~	~~— 601,561~~

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdeen Corporation...	Feb. 23	£1 550	£1,646	+ £96	38	£68,591	+ £4,534
Accrington Corp.....	,, 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	,, 26	215	249	+ 34	42	15,147	+ 1,078
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	,, 27	1,180	1,326	+ 146	47½	65,769	+ 6,086
Birmingham Corp.	,, 26	12,140	14,545	+ 2,405	48	690,085	+ 107,785
Blackburn Corp.	,, 23	1,037	1,045	+ 8	47⅞	59,547	+ 222
Blackpool & Fleetwood.	,, 26	290	273	— 17	8	2,572	+ 128
Blackpool Corp.	,, 24	612	661	+ 49	48	75,272	+ 2,943
Bolton Corporation.....	,, 27	2,394	2,465	+ 71	48	128,217	— 259
Bournemouth Corp.....	Mar. 1	1,755	1,690	— 65	48	100,719	+ 5,447
Bradford Corporation ...	Feb. 26	5,618	5,653	+ 35	48	306,124	+ 12,952
Brighton Corporation ...	,, 27	768	725	— 43	47½	51,850	+ 1,064
Bristol	,, 25	8,189	8,664	+ 475	8	74,192	+ 7,385
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 26	1,397	1,445	+ 48	48	76,601	+ 3,163
Burton-on-Trent Corp...	,, 27	256	216	— 40	48	13,649	— 386
Bury Corporation.....	,, 27	1,151	1,153	+ 2	47⅞	63,894	+ 470
Cardiff Corporation.....	,, 19	2,439	2,712	+ 273	46	126,042	— 268
Chatham & District.....	,, 24	955	984	+ 29	8	8,299	+ 751
Chesterfield Corp.	,, 24	239	253	+ 14	47	12,715	+ 170
Colne Corporation	,, 26	255	218	— 37	...	...	...
Cork Electric	,, 24	408	421	+ 13	8	3,584	+ 176
Croydon Corporation ...	,, 18	1,450	1,625	+ 175	46	84,235	+ 5,552
Derby Corporation	,, 26	873	858	— 15	47⅞	49,868	+ 2,381
Dover Corporation	,, 26	237	236	— 1	47	14,463	+ 2,314
Dublin & Lucan	,, 25	112	109	— 3	8	915	+ 5
Dublin United	,, 25	5,100	5,547	+ 447	8	46,957	+ 3,083
Dundee City	,, 23	1,173	1,278	+ 105	40⅝	55,312	+ 3,351
East Ham Corporation	,, 26	1,218	1,141	— 77	47⅞	61,960	+ 5,577
Exeter Corporation.....	,, 25	281	294	+ 13	47	17,592	+ 1,023
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	,, 26	19,745	21,446	+ 1,701	39	846,622	+ 64,351
Glasgow Subway.....	,, 26	1,077	1,236	+ 159	8	10,133	+ 1,218
Glossop (U. Elec. Supp.)	,, 26	109	106	— 3	9	1,169	+ 205
Halifax Corporation.....	,, 22	1,957	1,867	— 90	46⅞	103,003	+ 1,013
Hastings & District.....	,, 25	732	644	— 88	8	5,865	+ 289
Huddersfield Corp.	,, 26	2,246	2,405	+ 159	47	126,605	+ 17,141
Hull Corporation	,, 26	3,011	3,118	+ 107	47	147,043	— 840
Ilford U.D.C.	,, 26	540	568	+ 28	47	30,610	+ 3,391
Ilkeston Corporation ...	Mar. 1	115	127	+ 12	48	6,465	+ 408
Ipswich Corporation	Feb. 26	354	450	+ 96	46	25,617	+ 4,572
Isle of Thanet	,, 26	228	198	— 30	21	5,361	— 957
Kilmarnock Corp.	,, 19	144	161	+ 17	40	6,744	+ 295
Lanarkshire	,, 24	1,669	2,198	+ 529	8	17,161	+ 3,071
Lancashire United	,, 23	1,533	1,584	+ 51	8	12,580	+ 829
Leeds City.....	,, 26	7,935	8,438	+ 503	48	426,145	+ 34,508
Leicester Corporation ...	,, 26	2,766	2,975	+ 209	8	25,952	+ 3,290
Leith Corporation	,, 26	616	726	+ 110	41	31,551	+ 2,662
Leyton U.D.C.....	,, 24	1,513	1,402	— 111	47	75,363	+ 9,059
Liverpool Corporation...	,, 26	12,131	12,479	+ 348	8½	108,842	+ 8,011
Llandudno & Colwyn B.	,, 25	194	184	— 10	12½	2,333	+ 146
London County Council	,, 9	46,816	44,255	— 2,561	45	1,997,098	— 4,516
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	,, 26	141	125	— 16	20½	2,731	— 840
Maidstone Corporation..	,, 24	155	164	+ 9	47	10,119	+ 507
Manchester Corp.....	,, 26	16,223	16,811	+ 588	47	846,358	+ 31,259
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	,, 26	177	192	+ 15	47½	9,272	+ 643
N'castle-on-Tyne Corp.	,, 26	5,566	5,571	+ 5	48	293,606	+ 28,702
Newport (Mon.) Corp....	,, 26	706	803	+ 97	48	40,272	+ 1,976
New St. Helens & Dist.	,, 23	839	882	+ 43	34	34,617	+ 3,446
Northampton Corp.....	,, 25	633	649	+ 16	47⅞	34,191	+ 5,762
Nottingham Corp.....	,, 24	3,230	3,592	+ 362	47	175,921	+ 14,123
Oldham Corporation ...	,, 6	2,001	2,148	+ 147	46	104,400	+ ...
Portsmouth Corp.....	,, 26	2,013	1,833	— 180	48	116,385	...
Preston Corporation.....	,, 23	819	959	+ 140	47	46,124	+ 2,951
Provincial	,, 29	1,829	1,826	— 3	21½	43,519	+ 3,224
Reading Corporation.....	,, 24	659	696	+ 37	47½	37,307	+ 4,071
Rhondda Tramways.....	,, 17	1,048	1,161	+ 113	7	8,178	+ 746
Rochdale Corporation...	,, 26	1,430	1,414	— 16	45½	80,251	+ 4,142
Rotherham Corp.....	Mar. 1	904	1,146	+ 242	48	56,951	+ 8,133
Salford Corporation.....	Feb. 28	4,449	4,793	+ 344	47⅞	247,634	+ 11,963
Sheffield Corporation. ...	,, 27	7,763	9,067	+ 1,304	48⅞	439,891	+ 62,436
Southampton Corp.....	,, 23	1,194	1,396	+ 202	47	70,653	+ 8,565
Southend-on-Sea Corp...	,, 23	622	561	— 61	47	37,318	— 8,021
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	,, 19	663	713	+ 50	46⅞	36,795	+ 1,798
Sunderland Corp.....	,, 27	1,253	1,445	+ 192	48	71,948	+ 2,505
Sunderland District...	,, 23	555	575	+ 20	17	9,625	+ 897
Swindon Corporation ...	,, 23	168	172	+ 4	47	9,263	+ 874
Torquay Tramways.....	,, 17	387	416	+ 29	7	2,936	+ 294
Trys. (M.E.T.) 'Buses...	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	,, 16	493	489	— 4	7	3,388	+ 14
Wallasey Corporation ...	,, 26	1,013	1,084	+ 71	47⅞	59,998	+ 1,620
Walsall Corporation.....	,, 26	639	663	+ 24	9	6,566	+ 1,061
Walthamstow U.D.C....	,, 26	702	733	+ 31	48	41,856	+ 3,972
Warrington Corp.....	,, 17	412	496	+ 84	46	21,509	+ 1,404
West Ham Corporation	,, 24	2,773	2,882	+ 109	47½	145,738	+ 12,495
Wigan Corporation	,, 24	1,396	1,543	+ 147	47	71,686	+ 2,960
Wolverhampton Corp....	Mar. 1	987	812	— 174	48	53,864	+ 3,387
Yorkshire (W. Riding)...	Feb. 27	1,481	1,437	— 44	9	14,463	+ 1,709

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

POLE PAINTS

As supplied to important Companies at home and abroad. Durable, ready-mixed, permanent colours that defy rust and exposure. Samples and prices on request.

Robert KEARSLEY & Co., Ltd.
RIPON, England.

TRAMWAY SUPPLIES, Ltd.,

Tramway Engineers.

Sole Selling Agents for S. Dixon & Sons' Tramway Material,

160, WOODHOUSE LANE, LEEDS.

Sole Manufacturers of

TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 3488 Leeds. MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.

For Places Abroad—Thirty Shillings per annum.

THE AUTOBUS

IN THE TRAMWAY WORLD.

Motor Traffic Section.

When "The Tramway and Railway World" was founded in 1892, motor traction was, of course, scarcely dreamt of, but the avowed object of the paper was to encourage all new methods that gave promise of usefulness.

In pursuance of that policy the progress of motor traction received early attention. Commenting on the historic motor parade to Brighton in 1896, "The Tramway and Railway World" predicted that

> "It would give a prodigious impulse to transport both by road and rail."

Within a decade this prophecy was abundantly fulfilled and so much space has been devoted to the new industry that in 1906 a special

MOTOR TRAFFIC SECTION

was added. Every illustrated issue thus contains a section devoted especially to motor cars for Public Service, and includes articles on current topics, illustrated descriptions of new types of vehicles and accessories, and the latest news.

Public Service Motor Cars.

The importance of this section will be gathered from the fact that an increasing number of the leading municipal authorities, railway and transport companies, now own and operate large fleets of motor vehicles of various types, including omnibuses, char-a-bancs, motor lorries for the transport of goods, parcel delivery vans, tower wagons, motor street sweepers, etc.

COMPARATIVE TRAMWAY ACCOUNTS.

The latest Municipal Tramway Accounts are summarised in

THE TRAMWAY AND RAILWAY WORLD

OF FEBRUARY 10, 1915.

The capital and working reports are clearly and systematically arranged so that any required fact can be readily ascertained, while comparisons of results of the different systems can easily be made.

Particulars are given under the following heads:—

Capital Account :—
- Borrowing Powers.
- Borrowing Powers Exercised.
- Unexhausted Borrowing Powers.
- Capital Expenditure per mile of Single Track.
- Loans Outstanding.
- Sinking Fund and Loans Repaid.
- Depreciation, Renewal and Reserve Funds.

Gross Receipts :—
- Traffic.
- Other Revenue.
- Total.

Working Expenses :—
- Traffic.
- General.
- Repairs and Maintenance.
- Power.
- Total.

Gross Profit on Working.

Reductions from Gross Profit :—
- Interest.
- Sinking Fund.
- Income Tax.
- Depreciation and Renewals.
- Sundries.
- Total.

Net Surplus or Deficit.

Appropriation of Net Surplus :—
- Carried Forward.
- Reserve.
- Relief of Rates.

Percentage of Operating Expenses to Total Revenue.

Receipts per Car Mile :—
- Average Total per Car Mile.
- Average Traffic Total per Car Mile.

Operating Expenses per Car Mile :—
- Traffic.
- General.
- Repairs and Maintenance.
- Power.
- Total.

Average Operating Expenses per Car Mile (excluding Power Cost).

Energy Consumption :—
- No. of B. of T. Units used.
- Cost per Unit.
- Units used per Car Mile.

Traffic Records :—
- Population served.
- Car Mileage.
- Passengers Carried.
- Passengers Carried per Car Mile.
- Average Fare per passenger.
- Average Journeys per head of population served per annum.
- Average Car Miles per day per Car.
- Traffic Revenue per Mile of Single Track.
- Average Traffic Revenue per annum per head of population served.
- Operating expenses per passenger.
- Average distance of rd. fare.
- Average fare charged per mile.
- Average speed per hour.
- Average Car hours per day.
- Average number of Cars in use daily.
- Number of Cars in stock.

Digitized by Google

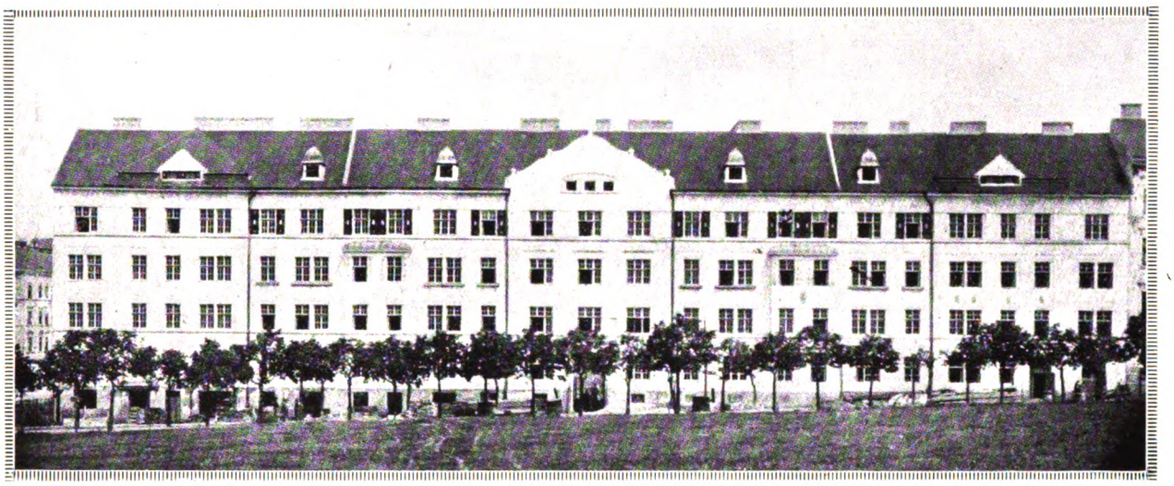
THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, MARCH 9, 1916. VOL. XXXIX.

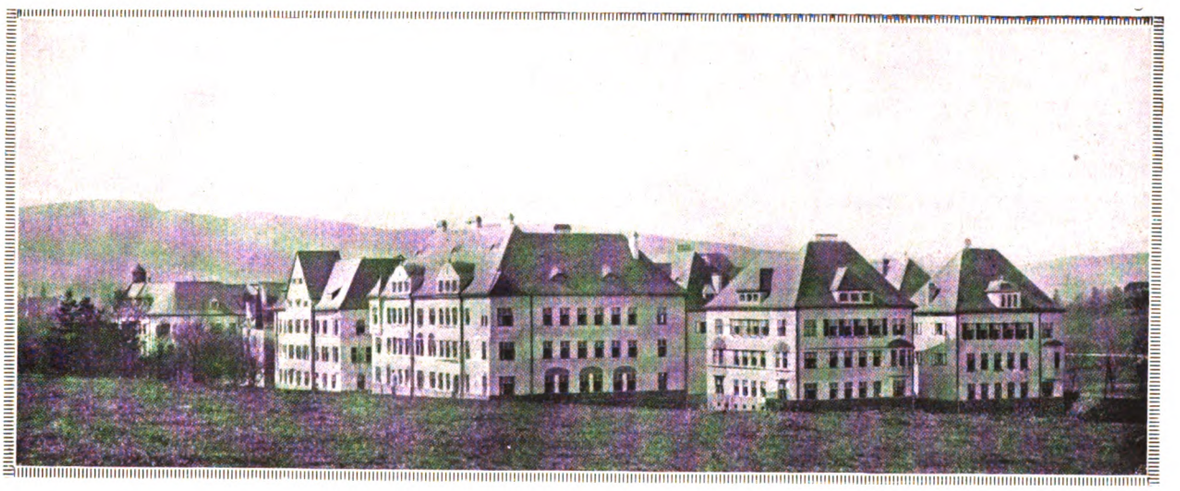
VIENNA TRAMWAYS SEMI-CENTENARY.

SOME FEATURES OF AN IMPORTANT MUNICIPAL SYSTEM THAT BEFORE THE WAR OBTAINED GREAT SUCCESS.

The Vienna tramways celebrated their semi-centenary in the midst of the war. The first horse tramcar was run in the Austrian capital on October 4, 1865, over a line 2·5 miles in length. From this small beginning has been built up during the last fifty years an undertaking which now forms the greatest municipal enterprise of the city of Vienna, and provides transport for its two million inhabitants.



Typical Apartment House for Vienna Municipal Tramway Employees.



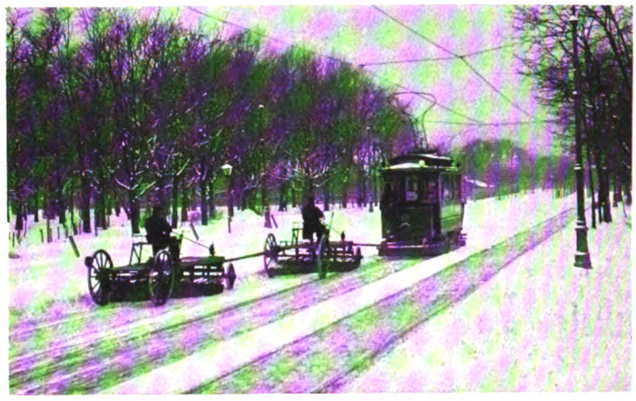
A Group of Suburban Flats for Vienna Municipal Tramway Employees.

The original undertaking was, of course, the result of private enterprise, and although the company was well managed, the position gradually became more difficult for the private owners. A great strike in 1897 proved the turning point in the history of the undertaking, and led the Vienna Council to consider the traffic question. The cry for municipalisation increased, and the late Dr. Lueger, who was a convinced municipalist, succeeded in bringing about the change. In March, 1899, the municipality took over the concession of the Vienna Tramways Company, and soon a great advance was made by the introduction of

Digitized by Google

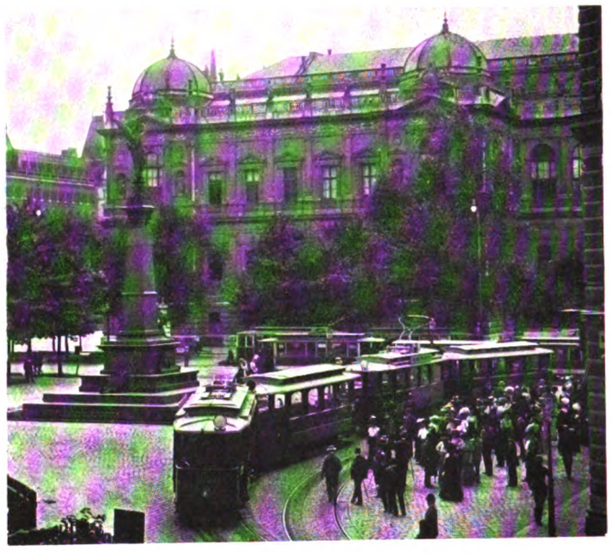
electric traction. The city found some difficulty, however, in carrying out the equipment, and renewed agitation resulted in the forming of a company for the construction and working of the tramways. This company undertook to convert fifty miles of tramways and to work them for the city, but opposition to this arrangement ensued, and in January, 1902, the municipality finally took over the undertaking, and entrusted to Siemens and Halske the construction of a further 25 miles of line, which under the terms of the arrangement they were bound to complete in 1903.

Certain tramways were still in the hands of a company, and in Vienna, as elsewhere, divided control in the provision of local transport gave rise to numerous practical difficulties. For instance, while the municipal tramways gave cheap early morning tickets to workmen, the company were unable to offer the same privileges without loss. It was also a cause of complaint that the rates of wages and salaries paid by the two undertakings varied considerably. The municipality eventually decided that it would be in the public interest for the whole of the tramways to be owned and worked by them, and consequently, in May, 1902, the other tramways were purchased, and the lines were converted to electric traction by the Austrian Schuckert Works. Centralisation was thus effected, and on July 1, 1903, the municipality assumed control of the whole system. Since that date the tramways have been greatly extended, routes having been constructed into new suburbs, and the speed of the cars raised from 6·2 to about 7·5 miles per hour. These improvements have led to marked alterations in the conditions of living in the city, and it is generally felt that the action of the municipality in acquiring the whole of the lines has been justified.



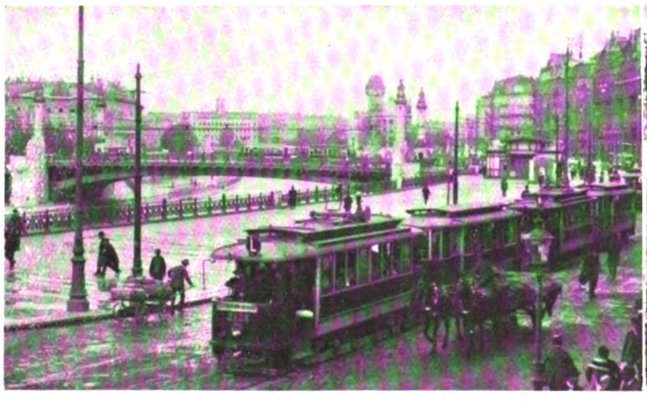
Motor Car and Snow Ploughs in Vienna.

Motor Cars and Trailers in Mariahilferstrasse.



Departure Point of "Round Vienna" Route.

Under municipal control great attention has been paid to technical questions, including both track construction and car design, and careful study has been given to traffic requirements. A notable feature is the care that the municipality has paid to the housing

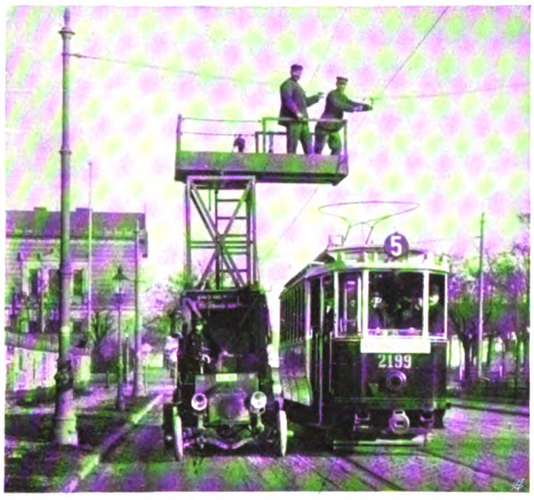


Motor Cars and Trailers on Franz-Joseph Quay.

Tramway Queues at the Central Cemetery, Vienna.

Digitized by Google

question. Well-built blocks of flats of attractive architectural design have been constructed for the accommodation of the employees and their families. No less than 6,600 separate apartments have been provided under healthy conditions and amid attractive surroundings. Public baths and playgrounds have been erected in connection with the dwellings, and every effort has been made to add to the amenities of life among the employees. Previous to the outbreak of war 12,000 men were on the roster of the tramways department. The municipality desires to make the



Motor Tower Wagon and Standard Vienna Vestibule Car.

work of its employees a career, and provision is made for pensions after thirty years' or thirty-five years' service.

The undertaking has been financially successful, and since 1903 a total of 26,000,000 kr. has been paid to the municipality out of the profits. The war has seriously interfered with the progress of the undertaking, but few particulars can be obtained as to the exact position.

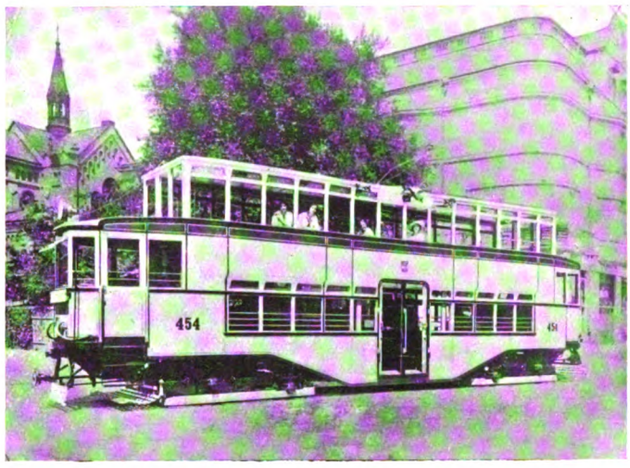
The *Elektrische Kraftbetriebe und Bahnen*, of Berlin, in the course of a long article on the history of the

Tramway Shelter at Vienna Stock Exchange.

Vienna tramways, published in a recent issue, does not attempt to give any details of the results of the war upon the undertaking, but it alludes to the special services which have been performed for the authorities. A goods service, providing for the carriage of fuel and necessaries, has been organised, and a number of cars have been reconstructed to serve as ambulances, these cars apparently being used to convey the wounded from the railway stations to the hospitals. Herr Ludwig Spängler, the manager, and some of the officials have been decorated for the part which they have taken in the work.

MIDLAND RAILWAY STORAGE BATTERY LOCOMOTIVE.

About eighteen months ago the Midland Railway Company put into service a storage battery locomotive for shunting and sorting the coal traffic in the



Novel Type of Car Introduced in Vienna Shortly Before the War.

West India Dock Depot, London. The work was previously performed by horses in connection with a number of turntables situated in each road, and investigation showed that the task could be performed more satisfactorily and economically by an electric locomotive than by horses, hydraulic or electric capstans and snatch-heads.

A locomotive is also considerably more flexible in operation than any of the alternative arrangements, and as the ordinary steam locomotive cannot enter the yard, the only access from the railway being by

Tramway Station at the Prater, Vienna.

means of an hydraulic wagon lift, the whole of the work has to be performed by the electric locomotive. High speeds are, of course, unnecessary in working a yard of the type in question, and the maximum speed attained with full load is only about seven miles per hour, speeds up to twelve miles per hour being attained with light loads. The rated capacity of the locomotive is six loaded wagons weighing 15 tons each, and twelve light wagons of approximately 6 tons each.

Digitized by Google

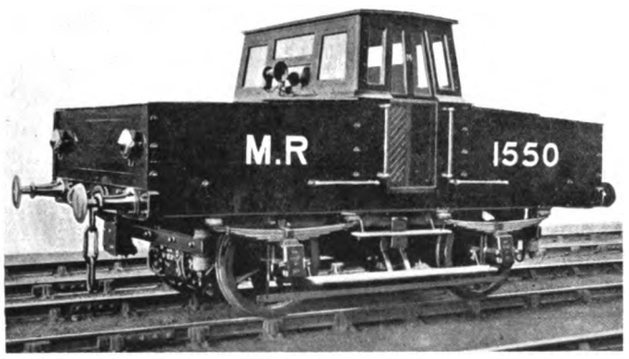
The weight complete with battery and all equipment is 17½ tons, and the wheel-base is 8 ft. 6 in.

The general appearance and method of construction of the locomotive is well shown in the accompanying illustration. There are two motors, one on each axle, of 22 H.P. each, supplied by Messrs. Dick, Kerr and Company. The battery, which is situated in the two end compartments, was provided by the D.P. Battery Company, Limited. It consists of 108 cells, 21-plate TL. type, and has a capacity of 300 ampere-hours. The cells are the D.P. Battery Company's standard train-lighting pattern in lead-lined teak boxes, and are fitted with "block" type lids.

It is important to note that the locomotive has not been out of service at any time on account of the failure of the battery, and that no single cell has failed since put to work about eighteen months ago. The battery has been in daily use (except Sundays), the discharge rate varying from 40 to 90 amperes, with occasional spurts up to 150 amperes.

The battery is charged every day from about 12.30 p.m. for one to two hours, and a "refreshing" charge is given in the early morning. When the battery was cleaned out the work was done without interrupting the service. The plates were in excellent condition.

It had been expected that the severe jolting occasioned by continual shunting of the coal wagons would cause many renewals of such parts as separators,



Midland Railway Storage Battery Locomotive.

ebonite sheets, etc. This was found, however, not to be the case; and out of over 2,000 wood separators in the battery it was necessary to renew only about three dozen. Only a very few ebonite sheets were split. This is partly due to the careful suspension of the truck and also to the tough qualities of the accessories. The four-bar bottom block, a special feature of the "D.P." cell, on which the plates stand, proved its worth; no shorting had taken place, and there was no indentation, as the weight is better distributed than on the two-bar block.

Control is by the ordinary series parallel method, providing two economical running speeds, but no restrictions are put on the drivers with regard to the use of the other notches. Braking is of the rheostatic type operated by the main controller, this method being very useful for shunting. A band brake with hand operation is also fitted to each axle, being equivalent to the tender brake on steam locomotives.

Charging is effected by a motor generator, the voltage of supply from the Poplar Borough Council of 460 volts being too high to offer any advantages for the use of a reverse booster. The generator is differentially compounded, so that after current is switched on further attention is unnecessary except in the case of a "gassing" charge.

GEAR-DRIVEN CONTINUOUS CURRENT TURBO-GENERATOR SET.

Recent developments in the science of gear cutting have attracted attention, chiefly on account of the introduction of high-speed gearing in the driving of ships, both mercantile and naval, whereby the lightness and economy of a high-speed turbine can be combined with the efficiency of a slow-speed propeller.

There is, however, another field which offers great possibilities for the use of gears in combination with turbines, viz., the driving of continuous current generators. Certain mechanical and electrical difficulties appear to be inseparable from the design of continuous current machines of any considerable output running at any speed approaching that desirable for an efficient steam turbine, with the consequence that up till very recently continuous current generators have either been driven by reciprocating engines, or, if turbine driven, have been subject to undeniable limitations in either speed or output, or both.

The direct current generator is essentially a moderate speed machine, and does not lend itself readily to construction for the high speeds of steam turbines. At the slow speeds of gas and oil engines, both direct and alternating current generators become large and costly for their output, and a good efficiency can only be obtained by further adding to the cost. At the moderate speeds of so-called "high speed steam engines" and motor generator sets conditions improve, and sound, high efficiency machines can be designed without difficulty.

In building continuous current direct coupled turbo-generator sets, mechanical difficulties arise in the construction of the commutator, in securing the armature windings, and in arranging that the running speed shall not be near the critical speed. Electrical difficulties arise on account of the high reactance volts of the coils undergoing commutation and high volts per commutator segment. To ensure satisfactory operation a field structure with compensating windings is usually employed, and the consequent extra excitation losses together with the rapid increase of core loss, friction, and windage at high speeds, combine to reduce the efficiency considerably in spite of reduced armature copper and shunt field losses. The compensated field construction also considerably increases the cost and the time required to build a machine.

As typical commercial efficiencies for the three types of generators we may take 91 per cent. for a 250 KW. 440 volt slow-speed machine, 93·5 per cent. for a moderate speed machine of the same rating, and 89 per cent. for a generator running at steam turbine speed. The reduction gear would have an efficiency of about 98 per cent., which gives 91·6 per cent. as the combined efficiency of the generator and gear. Geared turbo-generator sets can now be built for practically any output to compete in cost, efficiency, reliability, and floor space with either turbo-alternator rotary equipments or reciprocating-engine sets.

As indicated above, the gear-driven generator is built on normal lines, and therefore calls for little detailed description. Being designed to run at a fairly high speed, so as to keep the cost of gear and generator at a minimum, all details of design require careful attention.

The practice followed by the British Thomson-Houston Company to produce a sound, efficient, moderate speed generator may be outlined as follows:—Thin laminations of special steel are used for armature core and pole faces to reduce the core loss, as the frequency of the armature currents before commutation

Digitized by Google

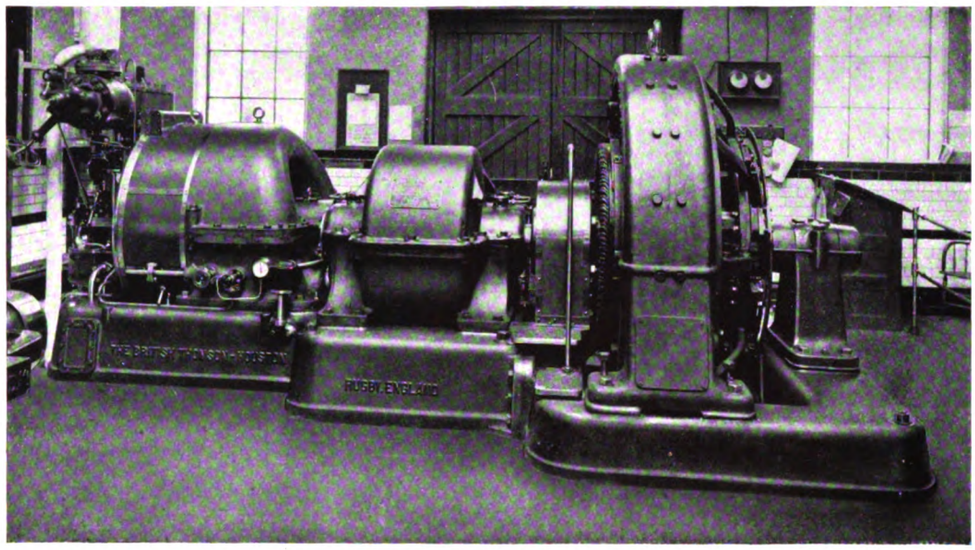
will be 40 to 50 cycles per second. Armature clamping bolts which pass through the core are insulated to reduce eddy currents. The air gap is made longer than would be the case with a slow speed machine, so that the distortion of the main flux caused by armature reaction is reduced.

The commutating poles are so designed that over the whole working range from no load to the guaranteed overload the commutating flux is practically proportional to the load on the machine. The commutating pole air gap is adjusted on test so that the reactance volts of the coils undergoing commutation are exactly neutralised. Diverters across the commutating pole windings are not used as, although they form a convenient method of test adjustment, the amount of current diverted is apt to vary on account of changes of resistances due to temperature and variation of the resistances of connections, which in the case of low resistance windings may form an appreciable item. Also, on varying loads, a plain diverter will not take a uniform share of the current as its inductance is very much less than that of the winding. Inductive diverters are difficult to adjust and are not satisfactory.

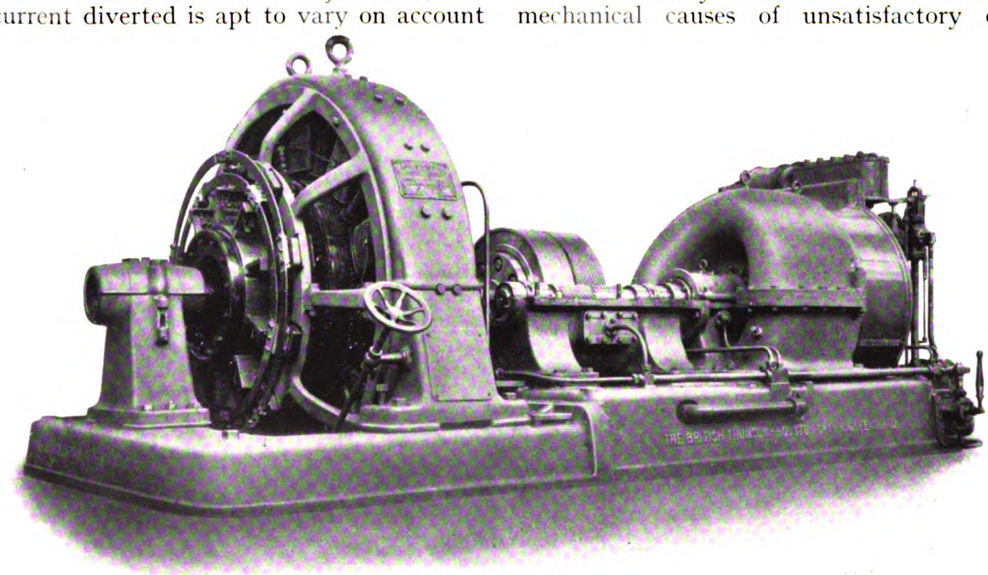
Even when adjusted to operate perfectly up to heavy overloads, commutating machines are always liable to flash over on heavy short circuits. To minimise the risk of flashing over and to reduce the damage caused by a flash, the clearance between adjacent brush brackets should be kept a maximum and the space between the commutator and the bearing should be kept free from bus rings or earthed metal parts as the flash always tends to spread outwards from the machine.

Reference to the illustrations will show that the B.T.H. design of brush gear fulfils these requirements. A substantial brush yoke supported from the magnet frame, brush springs designed to prevent brush chatter, and a carefully balanced armature eliminate the mechanical causes of unsatisfactory commutation. Graphite brushes reduce the commutator loss to a minimum and rapidly produce a hard polished skin on the commutator, the wear of which is very slight.

Equaliser rings fixed in an accessible position at the back of the armature prevent unbalanced magnetic pulls and equalise the distribution of the load between the several paths through the armature, which is of course parallel wound. The choice of a suitable speed



Gear-Driven Continuous Current Turbo-Generator Set.



Gear-Driven Continuous Current Turbo-Generator Set.

Digitized by Google

and number of poles limits the volts per bar to a reasonable figure. The armature windings are secured against centrifugal force with an ample factor of safety by means of fibre wedges in the slot portion and steel wire binding bands on the ends.

A set recently installed by Mr. Cameron Gibson, the borough electrical engineer, in the power station of the Nuneaton Corporation, is an interesting example of a gear-driven set. It consists of a B.T.H. shunt-wound generator having a normal output of 1,500 amperes at from 470 to 500 volts, driven through double helical gearing by a B.T.H. Curtis turbine of 750 KW. normal capacity. The set has an overload capacity of 25 per cent. for two hours and 50 per cent. for five minutes. The complete set has been constructed by the British Thomson-Houston Company, and the turbine is of their standard three-stage design as used for driving alternators, and runs at 3,250 revolutions per minute, the gearing reducing the speed to 600 revolutions per minute for the generator. The turbine drives the pinion shaft through a double claw coupling, which allows the pinions to take their correct axial position without any end thrust being transmitted to the turbine shaft. The armature spider is bolted direct to a large flanged coupling on the slow speed shaft, the bearings of which consequently carry a portion of the armature weight.

The gears and bearings are completely enclosed and have a copious supply of oil from the main oil pressure system of the turbine, which also operates the servo-motor of the well-known B.T.H. governor gear. A return pipe from the bottom of the gear case leads the oil back to the main oil tank, whence the oil pump on the turbine delivers it through an oil cooler back to the supply pipes.

This set was put on commercial load in January of last year, after exhaustive tests in the shops of the makers had proved that guarantees were fully met, and the completely satisfactory manner in which the set has behaved since its installation has given all concerned perfect confidence in the future of this combination, and resulted in an order being given to the British Thomson-Houston Company for a duplicate set.

SOUTH SHIELDS STANDARD CAR.

The most recent type of car used by South Shields Corporation tramways is shown in the illustrations on the following page, for which we are indebted to Mr. J. C. Whiteley, general manager and electrical engineer. It will be seen that the car follows in general the standard practice in the design of four-wheeled top-covered cars. The open-air canopy seats are a valuable feature from the point of view of many passengers, and they are provided here with canopies of dimensions corresponding to those of the platforms. The main feature about the seating accommodation, however, is the fact that cross seats have been provided for the lower deck as well as the upper. This departure from the usual practice of longitudinal seats on the lower deck was also taken by the London County Council in the case of their new trailer cars. The car bodies, which were made by the Brush Electrical Engineering Company, are mounted on Peckham pendulum trucks. The wheel base is 7 ft. 6 in. Westinghouse 200 motors are provided, and the latest type of T. I. C. 1915 pattern controllers. In regard to the over-all height of the car, this had to be strictly limited, as the head room between the rail level and the underside of girders carrying a railway bridge, under which the cars run, is 16 ft. 1½ in. The seating capacity per car is 60, distributed as follows :—Inside lower saloon, 24 ; inside upper saloon, 28 ; on canopies, 8. The following are leading dimensions :—

	ft.	in.
Length of body over corner posts	17	5
Length of each platform	5	3½
Length over platforms	28	0
Total length over all	29	0
Width over sills	6	4½
Width over rocker mouldings	7	0
Width over roof	7	0
Clear height inside at centre lower saloon ...	6	6
Clear height inside at centre upper saloon ...	6	0
Overall height from rail to trolley base ...	16	1
Width of end door openings, lower saloon ...	1	11
Height of end door openings, lower saloon ...	6	1
Gauge	4	8½

LACRE TOWER WAGONS FOR SANTOS.

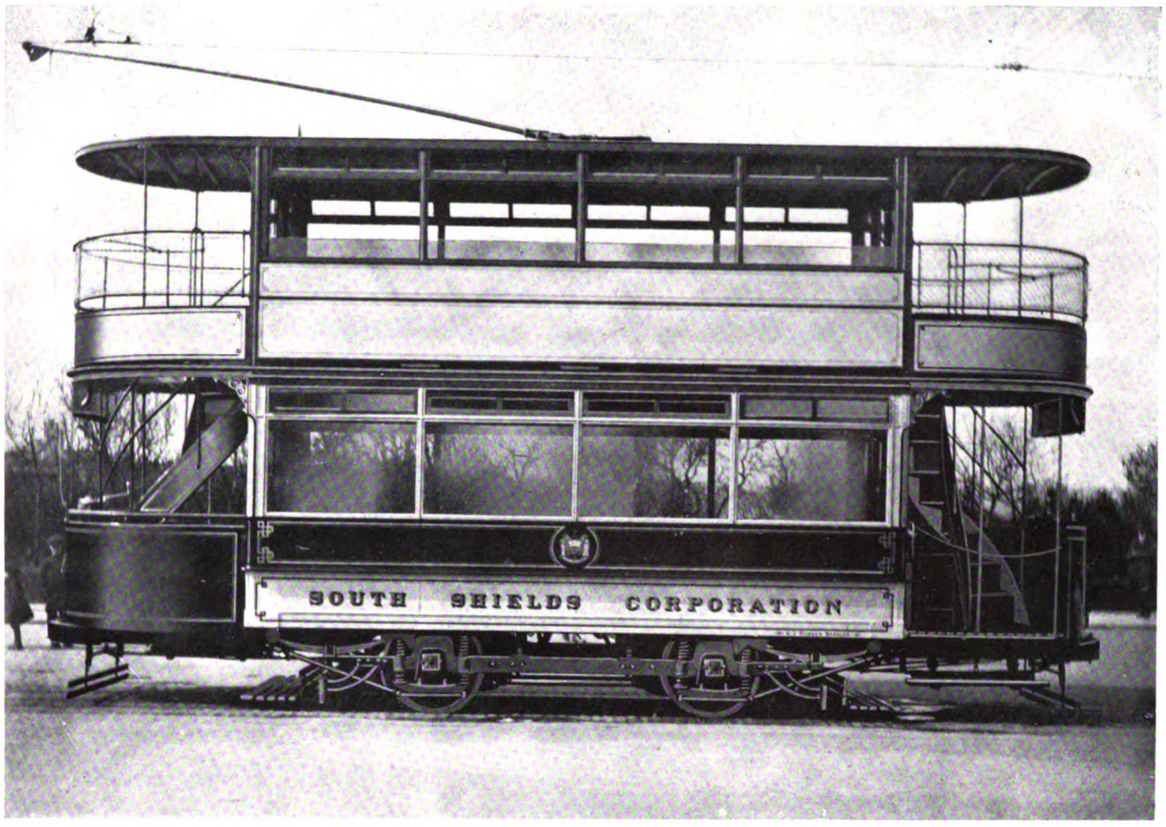
The 18-H.P. Lacre telescopic tower wagon illustrated below was built by the Lacre Motor Car Company to a repeat order from the City of Santos Improvements Company, Limited, who own a large fleet of Lacre cars, and at the present time have a chars-a-banc on

order. The telescopic platform of this tower wagon can be raised to a height of 16 ft. above the road level. The driver's seat holds three persons, and the dimensions of the box behind the tower are approximately 5 ft. 6 in. by 5 ft. 3 in. There is a seat at the rear for two persons.

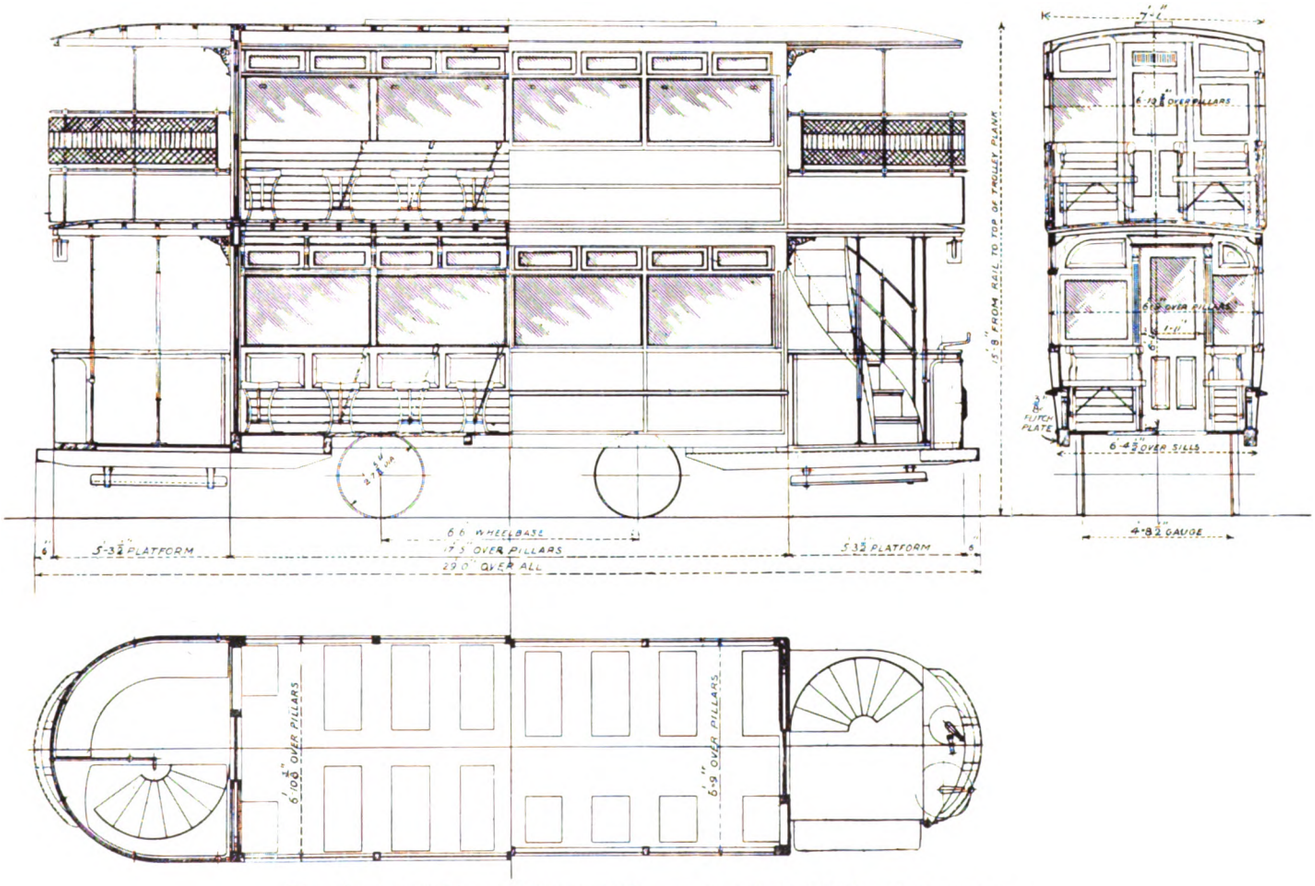
PETROGRAD TRAMWAYS CRISIS.

The Petrograd electric tramways undertaking is threatened with paralysis ; in fact, it is stated in the Petrograd press that quite 60 per cent. of the cars are not now running, for one reason or another, including want of repairs and shortage of fuel at the power-station, but generally for want of efficient maintenance. Various engineering shops in the country have cars ready for delivery to supplement those that are running, but owing to the unfortunate interruption on the Russian railways, it has been found impossible to deliver these cars to Petrograd. The consequence is that the cars now running are crowded to "suffocation," whilst it is made impossible for the conductors to collect the fares. The scandal, for so it is called, has been brought before Petrograd Town Council, but it has been found impossible to hold anybody answerable for the confusion so caused. According to the newspapers, it now appears to be nobody's business to manage the tramways. The resignation just announced of the Town Governor has not contributed to simplify the many problems, including the tramway difficulties that confront the authorities.

Digitized by Google



South Shields Corporation Tramway, Side View.



Elevations and Plan of Standard Type Car—South Shields Corporation.

Digitized by Google

THE
Tramway AND Railway World

FOUNDED IN 1892 AND PUBLISHED BY
THE TRAMWAY AND RAILWAY WORLD PUBLISHING COMPANY, LIMITED,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

SUBSCRIPTION:

THE TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum

THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

FOR ALL PLACES ABROAD—Thirty Shillings per annum.

Single Copies—One Shilling (Postage, 2 pence—Abroad, 5 pence).

THE EDITORIAL AND PUBLISHING OFFICES OF
THE TRAMWAY AND RAILWAY WORLD
ARE AT AMBERLEY HOUSE, NORFOLK STREET,
LONDON, W.C.

Telegraphic Address: "TRAMIGRO, LONDON."
Telephone No.: GERRARD *2948.*

LONDON, MARCH 9, 1916.

Street Traffic Regulation.

The recent extension of the areas in which reduced lighting is compulsory calls for further attention to the necessity for strict regulation of street traffic with the object of minimising accidents and also of facilitating transit. In London one of the chief troubles is in connection with vehicles overtaking tramcars at stopping places. County Council and police regulations as to the breakdown of vehicles on tramway tracks and as to slow-moving traffic keeping close in to the kerb seem to be fairly satisfactory. But in the darkened streets passengers entering and leaving tramcars are still subject to the danger of being run down by overtaking vehicles, especially by those of the high-speed motor variety. A great deal more should be done to minimise this danger. As usual, Glasgow appears to be further ahead in the matter of regulation than many other places. Since May 1 of last year there has been in force an admirable set of bye-laws for regulating street traffic. These bye-laws were made under powers conferred by Section 28 of the Glasgow Corporation Order Confirmation Act, 1912. The regulations were made by the city authorities on April 16, 1914, but were not confirmed by the Secretary for Scotland till a year later. No. 10 provides that when a tramcar is standing at a stopping place every driver of a vehicle who intends to pass on the near side shall draw up until the roadway is clear of passengers entering or leaving the car. Other bye-laws deal with slow-going traffic, breakdowns, etc. The penalty for breach of the regulations is a fine not exceeding 40s. The Glasgow tramway department have found Bye-law 10 of very great service, and it is rarely that a vehicle is to be seen passing through a crowd of passengers. Formerly it was quite a common occurrence. An order for restricted lighting came into force in Glasgow on February 25, so the bye-law ought to be of more service now than ever.

There seems to be no good reason why a bye-law of the kind should not be applied to every town and district where there are tramways. It is a very unsatisfactory thing that reckless drivers, whether of motor or horse vehicles, should be at liberty to imperil the lives of tramway passengers and can only be proceeded against after the damage has been done. What is wanted is the prevention of accidents. The subject has been agitated afresh in Manchester recently, especially since a passenger was killed by a motor cab as he was leaving a tramcar. Before that, however, the Manchester Watch Committee had recommended the Corporation to consider the question of obtaining legislation to deal with the subject. Manchester also is keenly alive to the necessity of having a bye-law to compel heavy motor and other vehicles to keep to their proper side of the road. Heavy vehicles with great loads are a prominent feature in Manchester street traffic, and years ago the tramway department organised a breakdown service which works with the speed of the fire brigade for the removal of broken-down lorries from the tramway tracks. The evil is increasing owing to the rapidly expanding heavy motor traffic, and Mr. McElroy, the tramway manager, in a recent report, insists on the necessity of a bye-law to deal with it. Tramway and other fast traffic is obstructed even when there is no breakdown of a heavy lorry, and the cost of track maintenance is increased. It is surely time that Manchester and other places in a similar position should have bye-laws like those of Glasgow. In regard to London, it is the case of the tramcar at a stopping-place which is most urgent, and

Digitized by Google

doubtless the Metropolitan Police have or can obtain power to enforce the necessary regulation. Their bye-law insisting on lower speed for motor vehicles at night might also with advantage be a little more stringent.

A Ministry of Commerce. In this issue we deal at length with the important events of the past month bearing on the subject of British trade after the war. The signs are hopeful for the establishment of a protective tariff, with preferential trade within the Empire and with our Allies. The Government seem to be gradually coming round to the views long held by those best acquainted with the position and the needs of British industries, but even with the best will the carrying out of such a scheme may take some time. There is, however, another proposal which could be promptly realised and which is, in fact, the first logical step in the revolution of our commercial policy. This is the constitution of a Ministry of Commerce. Upon this the commercial and industrial interests of the country should concentrate. Without relaxing efforts in favour of import duties on German goods, let full energy be turned on getting this Ministry constituted. There are endless arguments in favour of it; there seem to be no valid reasons against it. Leave to the Board of Trade its administrative work in regard to railways, shipping, and so forth, and let us have a Ministry of Commerce charged with the sole duty of fostering British trade. Such fostering can be carried out in many ways by administrative action, and whenever the Minister of Commerce found that he needed fresh legislative powers he could come to Parliament with a Bill to give the authority needed. The new Minister should be a thoroughly practical business man of initiative and wide experience, and his department should be endued with the business spirit. If by the time the Ministry has got into full swing, protection has not been granted by Parliament against Germany, a practical Minister of Commerce in full touch with the business of the country would not be long in asking for such a measure. The longer the time before a tariff is imposed, the more urgent and strenuous will be the demand for it from the country, and the greater the ease with which the Government of the day will be converted—if conversion it then needs. In fact, we can hardly conceive a competent Minister of Commerce who would not be a strong advocate of a measure of reform so urgently demanded and needed by many of our industries. A Ministry of Commerce has long been required, but never before has there been such an opportunity of bringing it to fruition.

"Safety First." The officials of the London traffic group could not have chosen a more timely question for consideration at their next efficiency meeting than the safety of the public. This is a matter in which this country is far behind the United States, where the "safety first" movement has spread from steam railways to street railways, with the result that in several cities a public department has been constituted, charged with the duty of promoting safe working on the part of both operators and the general public. In the United Kingdom the Great Western Railway has devoted a great deal of attention to the subject during the past three years, and before the war a considerable effort in the same direction was made by the Glasgow Tramways Department. Yet the need for a safety mission is greater now than it has ever been. The effect of the restricted lighting in the Metropolis upon the number of persons killed and injured has only to be realised to induce every provinicial traffic authority to put forth a special endeavour to prevent an extension of the danger to their localities, now that the diminished lighting regulations have been extended to so wide an area. Probably it is the lack of municipal spirit and cohesion among Londoners that accounts for their sitting dumb under the perils with which motor vehicles have surrounded them during the past decade. It is true that in 1913 one public-spirited Member of Parliament induced the Government to hold an inquiry into accidents due to mechanically-propelled vehicles. The revelations then made were serious enough to merit drastic action, but unfortunately the control of London's highways is vested in a Government department that fails to recognise its responsibility. The Joint Committee strongly recommended the creation of an independent authority for the control of London traffic, as was also suggested by the Royal Commission. Strenuous efforts were put forth

Digitized by Google

by the County Council to induce the Government to adopt this twice-urged reform, but the indifference of the people to matters that concern the public welfare has allowed the question to sink into oblivion. We therefore welcome the discussion on the part of the officials of the allied transit companies, and would urge that an attempt should be made to secure unity of action in an educational campaign. In this, the County Council, the omnibus companies, and the automobile organisations might all co-operate. The need is imperative, for in 1915 there were 867 fatalities, as compared with 625 in 1914 and 658 in 1913. These figures take no account of the greater number of persons who were only injured. Of the fatalities last year, 191 were due to private motor cars, 156 to motor omnibuses, 150 to trade and commercial motor vehicles, 87 to tramcars, 66 to motor cabs, and 28 to motor cycles. Horse-drawn trade vehicles ended the lives of 162 persons. That an effort to secure greater regard for safety on the part of drivers, passengers, and pedestrians will financially benefit the several traction undertakings is shown by the report presented to the County Council on the settlement of claims made in 1915 on account of accidents in the working of the tramways. A sum of £10,004 was paid in respect of 1,134 claims, and in 35 other cases actions were brought against the Council, with the result that in 14 a verdict was given against the authority, entailing payment of £634 and costs. Doubtless the claims department of the omnibus companies have to deal with a greater number of cases.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

It has been decided to hold the annual meeting and congress of the Tramways and Light Railways Association on Friday, June 30. Some of the out-of-town members having expressed a wish that matters should be so arranged as not to necessitate their spending more than one night in London, it has been arranged to have the papers and discussions at 2.30 p.m., and to devote the afternoon thereto. Members and their friends will dine together at 7.30 p.m. The same procedure will be adopted as last year—i.e., the dinner will be quite informal, and there will be no official guests, and no musical entertainment. The secretary of the association, Mr. A. de Turckheim, will be glad to hear from any member who wishes to read a paper.

Opening of a Tramway on a Grass Track.—Colonel Druitt, R.E., on February 21 inspected the extension of Doncaster Corporation Tramways to the new villages of Woodlands and Highfields, near Brodsworth Colliery, and in the afternoon the public service was inaugurated. The extension, which is 4½ miles in length, has cost £20,000, of which sum about £2,000 was expended in the removal of telegraph poles, the track for the most part being on the grass verge on the west side of the Great North Road. This idea emanated from Mr. F. S. Rayner, the tramways manager and electrical engineer. As the track will not be used by other traffic its maintenance cost should be low.

TRAMWAYS PERMANENT WAY MAINTENANCE.

To the Editor of the Tramway and Railway World.

Sir,—Referring to the paragraph in your issue of February 10, reporting the action of the Aberdeen Corporation with reference to the Aberdeen tramways permanent way maintenance, I should say that the average person not in possession of the full facts bearing on the matter would form the opinion that maintenance of the permanent way in connection with tramways can be carried out by the borough surveyor at less expense than if carried out by the manager of the undertaking.

This I dispute. Certainly statistics issued by the borough surveyor of Aberdeen point to this, but the old saying that "figures may be made to prove anything" applies in this case. For instance, as general manager of the Blackburn Corporation Tramways, the permanent way is under my control, and is shown in the statistics got out by the Aberdeen surveyor as costing £151 annually for maintenance per mile of single track. This figure includes renewals and relaying, which in Aberdeen is provided for out of a depreciation and renewals account.

In Blackburn this is different; instead of having ear-marked fixed amounts yearly for this purpose, the track is renewed out of revenue according to the requirements thereof, which tends to show the charges in revenue to be exorbitant, which is not so.

I am convinced that so far as Blackburn is concerned, this policy can be carried out and still yield a profit on the working of the system, as the charges on this account will remain almost stationary, and the track still be kept up to a high standard of efficiency without letting it get run down and thereby causing the cost at some particular time to be very heavy.

Considering my own case against a surveyor-controlled system, I do not intend to take second place in the matter of cost.

As to efficiency, this has not entered into the article, but permit me to state that a tramway manager knows his requirements as to the condition of the track for keeping down his running costs, and will see that such requirements are fulfilled; on the other hand, I should not think a borough surveyor is so interested beyond the particular work for which he is responsible.

My policy is—departmental management under control of one head, not divided amongst two or three persons, which in case of mismanagement means no one.

Yours faithfully,

J. H. Cowell,
General Manager.

Tramways Office, Blackburn,
February 28, 1916.

COLLECTION OF TICKETS AND REDUCTION OF IMPORTED PAPER-MAKING MATERIAL.

To the Editor of The Tramway and Railway World.

Dear Sir,—For many years I have advocated the collection of tickets by the conductor for the purpose of checking fares. The restriction of imported paper-making material, particularly wood pulp, by one third, furnishes another powerful reason why my contention should be admitted.

I submit that the lessened supply of ticket-making material would be largely met by all tramway and omnibus authorities collecting, packing, and returning the tickets after use to the ticket material makers, by ordinary sale or arrangement with the printers.

Henry Mozley,
General Manager.

Burnley Corporation Tramways,
General Offices, Queen's Gate, Burnley,
February 21, 1916.

Digitized by Google

TRADE AFTER THE WAR.

THE ADVISORY SUB-COMMITTEE'S REPORT.
RESOLUTIONS OF CHAMBERS OF COMMERCE.
THE NEW ATTITUDE OF THE GOVERNMENT.

We are living in remarkable times. In matters of trade and commercial policy, no less than in military affairs, we see the upheaval which is in progress. Great and significant symptoms of the coming trade revolution have manifested themselves during the last few weeks. These include the report of a Sub-committee of the Advisory Committee of the Board of Trade on Commercial Intelligence, the resolutions passed by the Association of Chambers of Commerce, and the declarations made on behalf of the Government by Mr. McKenna (Chancellor of the Exchequer) and Mr. Bonar Law (Secretary for the Colonies). If resolute Government action follows on all these declarations, the country will find itself on the way to being independent in its trade, free from German commercial menace, and in possession of a tariff which will protect it from hostile trade action in the future.

THE ADVISORY COMMITTEE'S REPORT.

To take this matter first—as it was first in point of time among the subjects referred to, having been issued early in February—the sub-committee were appointed to report with respect to measures for securing the position after the war of certain branches of British industry. The report has been adopted by the Advisory Committee and presented to the Board of Trade. It is full of common sense and useful proposals, but the outstanding feature is that it recommends protective tariffs, in the case of the industries dealt with, against Germany. It is a practical document based on present actual circumstances.

Though the proposals of the sub-committee are important in principle, the inquiry was restricted for the purpose of showing what steps should be taken to secure the position after the war of firms who have undertaken certain industries in consequence of the exchange meetings leading up to the British Industries Fairs held under the auspices of the Board of Trade. The industries in regard to which the sub-committee inquired were paper manufacture, printing, stationery, jewellers and silversmiths, cutlery, fancy leather goods, glass-ware, china and earthen-ware, toys, electrical apparatus, magnetos, and brushes and brooms. From a table of imports into this country in 1913, it appears that the value of electrical machinery imported was £1,346,000, of which no less than £721,000 worth came from Germany. The value of magnetos imported was £500,000, of which all but £25,000 worth came from Germany. Out of £196,000 worth of imports of electric glow lamps, £156,000 worth was German. The total imports in all the trades considered were valued at £16,000,000, of which practically one-half came from Germany. On the other hand, under many of the headings, there are large British exports.

One proposal, if given effect to, would carry out a principle for which we have long contended in these pages. It is that Government departments, local authorities and statutory bodies controlling money raised by taxes or rates should be under legal obligation to purchase as far as possible only goods produced within the British Empire. For some time before the war began there was an improvement in some quarters, but the proposal of the sub-committee is none the less necessary.

One of the most important recommendations of the sub-committee is that the Government should consider anew the advisability of establishing a Ministry of Commerce, charged solely with the safe-guarding and extension of British industry and trade, and freed from the regulative duties in respect of railways, shipping, and harbours, and the duties in respect of labour which at present devolve on the Board of Trade. It is generally felt that the Board of Trade has too much to do, and that a Ministry of Commerce is urgently needed. The witnesses for the electrical trades who appeared before the sub-committee were specially strong on this point.

THE NEED FOR A TARIFF.

The witnesses and the memoranda which were sent in joined in regarding all the other proposals as of secondary importance in comparison with the question of tariff protection after the war. The opinion at which the sub-committee arrived is that where the national supply of certain manufactured articles, which are of vital importance to the national safety, or are essential to other industries, has fallen into the hands of manufacturers and traders outside this country, British manufacturers ready to undertake the manufacture of such articles in this country should be afforded sufficient tariff protection to enable them to maintain such production after the war. This resolution is somewhat limited in its scope, but the sub-committee went further. They said that in view of the desire for Imperial preference, and of the fact that the present high direct taxation tends to raise the rate of interest on money, it will be necessary to impose some widely-spread import duties. Such duties would go a long way towards satisfying the requests for special protective treatment for the industries which the sub-committee had under consideration.

The Council of the British Electrical and Allied Manufacturers' Association, we are glad to record, took a prominent part in the proceedings before the sub-committee. On the subject of tariffs, they put forward important proposals in favour of an Imperial Customs Union, a tariff on all imported goods which can be efficiently and economically manufactured in British workshops, a scheme of Imperial preference, a smaller preference for our Allies, any preference possible to neutral nations, and a highly protective tariff against German and Austrian goods.

Having reviewed a few features of this report, it may now be pointed out that the evidence brought before the sub-committee, the recommendations of that body, the resolutions passed by the Chambers of Commerce on the last day of February, and the first and second days of March, and the declarations of Cabinet Ministers to that association, all show that the feeling in favour of a tariff against Germany has become very general and is now the preponderating view. Free traders and free-trade newspapers have been converted. The case for the tariff is overwhelming in regard to those British manufacturers who have put down plant and found capital for lines of manufacture which hitherto have been mainly or entirely German or Austrian.

There is profound truth in the suggestion that after the war the attraction of the cheapness of German goods will be such as to weaken appreciably in the case of many buyers in this country the prejudice created by the war against things German and Austrian. Memories are proverbially short, and they will be made shorter where there is some supposed advantage associated with the process of forgetting. This applies not only to the individual buyer, but to such bodies as municipalities who have to deal with the ratepayers' money. They have been for years accustomed to buy the cheapest article, irrespective of origin and often of quality, and old habits are hard to break. A tariff

Digitized by Google

would prevent the German article from being the cheapest, so that the habit might go on. Without a tariff, one cannot rely on the continued patriotism of the public in the matter of purchasing. It is necessary, for the futue of our industries and the prosperity of the country generally, to make certain against the menace of an unscrupulous and penetrating foreign competition.

The Conversion of Manchester.

Even Manchester has now come into the tariff fold. It was the municipality of that city which some years ago filled up its big Stuart Street electric power station with German electrical machinery. But the Corporation have now seen the error of their ways and have adopted a standing order declaring that no contract shall be entered into with any person of German or Austrian nationality, or with any firm or company whose subscribed capital is held or controlled to the extent of one third or upwards by persons of German or Austrian nationality.

More important still is the revolution which was wrought in the latter part of February in the position of the Manchester Chamber of Commerce. Against the will of the majority of the directors of the Chamber, Cobdenism has been overthrown, and this important Chamber now marches with the vast majority of the others. The directors of the Chamber, in view of the then approaching meeting of the Association of Chambers, put forward a memorandum in favour of the continuance of free trade. This was defeated at a meeting of the Chamber in the middle of February by the carrying of a motion to refer the matter back to the directors. The latter demanded a poll, which resulted on February 21st in the memorandum being referred back by 988 votes against 527.

Mr. Docker and a Business Parliament.

Another significant feature of the times is the speech made by Mr. F. Dudley Docker at Birmingham, on February 23, when presiding at a lecture on engineering and public policy by Mr. T. C. Elder, under the auspices of the British Electrical and Allied Manufacturers' Association. In view of the eminent position which Mr. Docker holds in the business world, his opinions carry great weight. He pointed out that had a Ministry of Commerce been in existence at the beginning of the war, there would have been none of the scandalous waste of men, money, and brains, and but little of the labour trouble. He contended that it is the duty of manufacturers to insist absolutely that in future their voices must be heard, and that they must have a representation in the Government. He laid it down that the way to achieve this is to form one large association of business men, to be called the Business Parliament—a body which must be strong enough to give effective expression to its views and its requirements. It would be able to render invaluable service, helpful and advisory, to any Government which might have the duty of arranging our tariff system.

The Associated Chambers.

We now come to the highly important decisions of the Association of Chambers of Commerce. They were reached at a special meeting held in London on February 29 and March 1 and 2, for the purpose of considering problems of trade after the war. The main resolutions were submitted by the Norwich Chamber of Commerce. The general resolution, which was moved by Sir Algernon Firth, President of the Association, and adopted, declared that the strength and safety of the empire lie in ability to produce what it requires from its own soil and factories. Unanimous assent was given to a resolution declaring that the Government should take immediate steps to create a Ministry of Commerce and Industry with a Minister of Cabinet rank, aided by a Permanent Advisory Council, consisting of representatives of the Foreign, Colonial, and India Offices, the self-governing Dominions, and the leading commercial interests of the empire.

The Glasgow Chamber of Commerce presented a resolution asking the Government to consult the Governments of the Dominions and ascertain their views regarding the trade problems arising as the result of the war, especially in regard to reciprocal trading, and the regulation of trade relations with enemy countries and the control of businesses in the empire managed or owned by the subjects of enemy countries. This was adopted, as was also a very important resolution proposed by the London Chamber declaring that provision should be made for preferential reciprocal trading relations between all parts of the British Empire and between the empire and allied countries, for the favourable treatment of neutral countries, and for restricting by tariffs and otherwise trade relations with all enemy countries, so as to render dumping and a return to pre-war conditions impossible. The Government are being asked to confer with representatives of the Colonies, the Allies, and this country on the subject.

It is important to note that the conference unanimously passed a resolution approving the recommendations in the report of the Sub-committee of the Advisory Committee of the Board of Trade on Commercial Intelligence—the report which is dealt with in the first part of this article.

The Promising Attitude of the Government.

Most hopeful symptoms of the changing attitude of the Government on trade questions were evident from the speeches delivered at luncheons in connection with the congress by Mr. McKenna, Chancellor of the Exchequer, and Mr. Bonar Law, Secretary for the Colonies. In view of the fact that the former belonged to the late free-trade Government, his declaration may be described as epoch-making. He pointed out that we had found ourselves dependent in many essential matters of our trade on a nation which planned and provoked the war. He did not think that as a nation, whether by the individual efforts of our traders or with the necessary assistance of the Government, we ought ever to allow ourselves to be placed in that position again. The Government, he announced, were prepared to give assistance to the development of foreign trade in order to ensure that our enemies shall not have the control of that trade which they have enjoyed in the past. Mr. Bonar Law, who of course has been a tariff reformer all along, told his audience that we must begin from a new basis, that we must put aside all preconceived ideas on the subject. The resources of the British Empire, he affirmed, will never again be exploited by the Germans. He insisted on the necessity of making the empire independent from a trade point of view, and he made the important announcement that arrangements are being made for an economic conference of the Allies. This conference will deal both with war conditions and with what will happen after the war.

These are matters of fact, but just before this issue of the Tramway and Railway World went to press a report emanating from well-informed quarters was circulated that the Government intend shortly to inaugurate an important change in our commercial and fiscal policy. It is understood that the Government are to consider this matter fully before the approaching economic conference with the Allies. This may be the beginning of building a wall against German trade after the war.

Digitized by Google

Taking everything into account, it may be affirmed that the manufacturing and trading interests of this country and of the empire have a brighter prospect of achieving the reforms they desire than has existed at any previous time. Thus it is to be hoped that our industries will emerge from the war in a stronger position than they ever were before.

HALFPENNY FARES.

West Ham and Walthamstow Decisions.

At the February meeting of Walthamstow Urban Council the Light Railways Committee, on the advice of Mr. W. Murray, general manager, recommended the abolition of halfpenny fares, an increase in the price of workmen's tickets by 50 per cent., the discontinuance of ordinary return tickets on the Chingford Mount route, and slight revisions in the ordinary fares. The recommendations were agreed to after the Council had rejected three amendments. One amendment was for the continuance of halfpenny fares on the ground that the omnibus company were not likely to follow the example of the Council. Another member sought to delete the clause for increasing the workmen's fare; the third amendment proposed to refer the whole matter back for further consideration, although it had been under discussion for several months.

On February 22, West Ham Corporation considered a recommendation by the Tramways Committee to abolish the halfpenny fare and to put into operation the following fares:—(1) Universal 1d. fare for a continuous journey on any one car; (2) 1½d. workmen s return fare for a continuous journey on any one car; (3) existing through fares where necessary to be adjusted to comply with the foregoing alterations; (4) children's fares to remain as at present. The committee based their recommendation on a report prepared by Mr. J. S. D. Moffet, general manager, showing that although halfpenny passengers constituted 47 per cent. of the total carried during the twelve months ended March 31, 1915, the receipts only represented 28 per cent. of the total revenue, and the loss on the carriage of these passengers amounted to £14,200. The loss was recouped out of the returns from passengers paying higher fares. Similarly for the year ended March 31, 1914, the loss on this class of traffic amounted to £20,000, £10,000 of which was borne by the rates, £4,000 by the reserve fund, and the balance by passengers paying higher fares. Unfortunately the Council, by 29 votes to 15, rejected the committee's recommendation, and decided to further consider the matter in committee.

LONDON EFFICIENCY MEETINGS.

The second of the efficiency meetings for the officials of the operating department of the Underground railways and London General Omnibus Group took place at Electric Railway House, Westminster Broadway, Mr. H. E. Blain, operating manager, presiding over a representative attendance, which included, on the omnibus side, Mr. J. P. Thomas (general superintendent), Mr. H. Lansdown (assistant general superintendent), and Captain A. Rozier (superintendent of employment); and on the railway side, Mr. W. E. Blake (superintendent of the line), Mr. S. J. Webb (railway passenger agent), and Mr. A. W. Agnew (mechanical engineer).

A paper on "A Parcels System on the Underground Railways" was read by Mr. H. J. Carter, chief parcels clerk to the Central London and City and South London Railway. The paper, which was illustrated with maps showing the areas covered by the parcels arrangements and charts depicting the results over a period of years, dealt chronologically with the parcels organisation since its commencement on the Central London Railway in July, 1911. Collecting, booking, accounting, and delivery methods in operation were described, and the advantages and difficulties carefully discussed. The discussion was of an exceedingly practical character, one of the speakers giving a tabulation of the results obtained in regard to time, cost, etc., in relation to parcels sent on the Underground Railways and by other methods.

A Device to Assist Motormen.—There is no doubt that the most effective way to render tramcars invisible to raiders is to shade the lights and to varnish the lamps, as is done in London and in many other places. In some localities, however, all the windows are fitted with blinds, which are kept drawn down. This method has the disadvantage of preventing a motorman from seeing the conductor's platform, a necessary precaution against accidents. To overcome the difficulty in Sunderland, Mr. A. R. Dayson, tramways manager and electrical engineer, has installed a step with a light spring on the rear platform, so that when passengers enter or depart the action of the step illuminates the electric bulb at the motorman's end.

BRITISH RAILWAYS IN 1915.

The leading British railway companies have published their reports and held their annual meetings in respect of the year 1915, and it is now possible to take a useful survey of their results for that period. They have, of course, remained under Government control throughout the year, whereas in 1914, by Order in Council, they were taken over by the Government as from August 5, 1914. Whilst the entire railway system of Great Britain is thus placed at the disposal of the Government for naval and military purposes, the actual administration remains in the hands of the Railway Executive Committee, composed of the general managers of the leading railway systems, presided over by Sir Herbert Walker, the general manager of the South Western, as acting chairman. The railways of Ireland, and the "tube" systems in London, are outside the Government arrangement, and they are the only companies, consequently, which are in a position to publish complete accounts for 1915. Curiously enough, in most of these cases, improvement is shown in their position, although they have had no assistance from the Government in the way of guarantee of net revenue, or any assistance in meeting special expenditure on war bonuses, and increased working expenditure generally.

The original financial arrangement between the Government and the "controlled" railways was revised early in the past year, and again modified later in the year. The net result of these changes is that the companies are practically guaranteed net revenue equal to the aggregate net revenue of 1913, less one-fourth of the war bonus granted early in 1915 to all members of their staff within the Conciliation Scheme.

We append a complete table of British railway results for the past three years. This table shows the dividends for the pre-war year 1913, for 1914 (when practically half the year was under normal conditions and the other half under war conditions), and, also, for the year 1915, when war conditions prevailed throughout. On the whole, this table indicates no very serious shrinkage in dividends as compared with the pre-war year 1913. Taking a few of the leading companies, we find the London and North Western has certainly reduced its dividend since 1913 from 7 to 6, and the Great Western from 6¼ to 5¾; but on the other hand, the Midland Railway has only reduced its Deferred Ordinary Dividend by one quarter, and the North Eastern has only reduced its Ordinary Dividend by one half. In all these cases, reference to the figures relating to reserves and balances carried forward, also included in our table, shows that they have been substantially increased, and particularly so in 1915. There is quite enough evidence in this table to show that the financial position of the British railways has been more fully maintained than that of any other railway system in any other country, in spite of the disastrous war conditions. There is also abundant evidence that the arrangement between the Government and the companies has been an excellent one from the public point of view, and has resulted in an enormous amount of service to the State being rendered at less cost than would have been possible had the companies charged in the usual way for their services. In numerous minor directions the railways have also been able to serve the public. Their steamers and harbours have been at the disposal of the Government, and have been freely utilised, and their valuable workshops have also been largely utilised for munition work.

The form of accounts adopted for 1914 and 1915 has been specially adapted to war conditions, as approved by the Board of Trade, and, consequently, lacks a good

Digitized by Google

many of the usual details. There is one account appearing in every company's report, however, which is well worth careful study; we refer to the General Balance Sheet (No. 18). In the case of all the leading companies, the balance sheet shows a marked improvement, and the aggregate reserves and additions to the Depreciation Funds, etc., of the leading companies, provided out of the profits of the past year, represent over four millions sterling. To a considerable extent this represents provision for renewals, etc., which have been delayed by shortage of labour and materials. Various companies, in their auditors' certificates attached to their accounts, have called attention to claims against the Government in respect of deferred maintenance and renewals. Some companies have omitted reference to this matter, but in the great majority of cases such a claim exists, and, according to the addresses of various railway chairmen at recent meetings, the claim has been admitted in principle; indeed, we understand that—subject to proper investigation—these claims will be paid by the Government, plus an allowance for increased cost in carrying out such work, owing to present enhanced cost of labour and materials. There is another claim which has arisen, and has been referred to at various meetings; we refer to the interest on capital expenditure incurred since the year 1913. No provision was made for such interest on this outlay in the original arrangement between the Government and the companies: here, also, the claim is likely to be met. No credit is taken in any of the balance sheets in respect of these two important claims. The position of the companies after the war is, of course, a matter of considerable uncertainty, but the strong position reflected in their general balance sheets, and the payments still to be made by the Government in meeting the claims referred to, will provide some means of helping them to confront the difficulties that may arise.

Many thousands—about 150,000 railway men—have already enlisted in some branch of the fighting services, and this has proved a serious difficulty, considering the abnormal demands made upon the railway system. This outstanding fact must be taken into account, and, all things considered, the heavy requirements of the Government, and the normal demands of the trading and travelling public, have been met with a degree of efficiency hardly to be anticipated, even from so ably administered a railway system as that of this country. There is another striking fact, viz., the railway service for the public is practically the only service which, under war conditions, has not involved an increased charge to the public. Bearing in mind the prevailing widespread advance in prices, to say nothing of the alarming advance in shipping freights, this is perhaps the most remarkable feature at the moment. In looking round for new methods of raising revenue for the public, and, indeed, increasing the so-much-to-be-desired economy, the Chancellor of the Exchequer could scarcely do better than raise goods and mineral rates by, say, 10 per cent. Such a charge at the present time would raise a considerable revenue for the Government without any appreciable cost of collection, and at the same time provision would be made for meeting the additional cost of war bonuses, higher price of coal, and material included in the working expenses.

BRITISH RAILWAY RESULTS FOR THE PAST THREE YEARS.

Railway.	Stock.	Dividends.			Reserve, &c.			Carried forward.		
		1915	1914	1913	1915	1914	1913	1915	1914	1913
					£	£	£	£	£	£
Alexandra Dks. and Railway	B. Pf. ...	4½	4½	4½	12,124	6,500	19,773	11,959	12,508	12,276
Barry	Ord. ...	9½	9½	10	—	—	—	—	—	—
"	Def. O. ...	5½	5½	6	—	—	—	6,874	3,333	4,298
Brecon and Merthyr ...	2 Pf. ...	2	2	4	5,000	7,000	4,000	1,677	956	1,375
Cambrian	D. Deb.	4	4	2½	10,000	10,000	3,500	11,372	15,054	8,134
Cardiff	2 Pf. Ord.	3	3	3	—	—	—	—	—	—
"	Ord. ...	1	Nil.	1	—	—	—	11,306	17,513	7,383
Central London	Ord. ...	3	2½	3	—	—	—	15,685	15,413	20,878
City and S. London ...	1901 Pf ...	5	2½*	2½	—	—	—	—	—	—
" " ...	1903 Pf....	5	2½*.	5*	—	—	—	9,027	—	738
Cleator and Workington ...	Ord. ...	4	3½	4½	—	—	—	860	505	187
Furness	Ord. ...	2	1	2½	—	—	—	12,265	1,804	1,698
Great Central	1889 Pf....	4	4	4	—	—	—	—	—	—
" "	1891 Pf....	4	4	4	—	—	—	—	—	—
" "	1894 Pf....	1	Nil.	2	—	—	—	7,214	7,675	8,700
Great Eastern	Ord. ...	2½	2½	2½	†10,000	10,000	10,000	108,949	108,909	111,146
Great Northern	Ord. ...	4½	4½	4½	—	—	—	—	—	—
" "	Pf. Ord.	4	4	4	—	—	—	—	—	—
" "	Def. Ord.	2½	2½	3	—	60,000	60,000	128,325	101,066	130,796
Great Western	Ord. ...	5½	6	6½	200,000	200,000	200,000	160,000	115,601	128,780
Hull and Barnsley	Ord. ...	2	2	3½	—	—	5,000	8,470	11,507	16,244
Isle of Wight	Def. Ord.	2½	2½	2½	—	—	—	—	2,024	1,916
Isle of Wight Central ...	1 Pf. ...	—	3½	4	—	—	—	—	822	1,007
Lancashire and Yorkshire...	Ord. ...	4½	4½	4½	—	20,000	20,000	40,374	45,999	40,780
Liverpool Overhead ...	Ord. ...	3½	3	3	4,400	4,400	4,400	6,873	7,013	6,275
London and North Western	Ord. ...	6	6	7	200,000	100,000	100,000	174,574	109,003	101,927
London and South Western	Ord. ...	5½	5½	5½	—	—	—	—	—	—
" " "	Pf. Ord.	4	4	4	—	—	—	—	—	—
" " "	Def. Ord.	1½	1½	1½	—	20,000	—	59,470	52,623	42,599
London Brighton	Ord. ...	5	4½	5½	—	—	—	—	—	—
" "	Pf. Ord.	6	6	6	—	—	—	—	—	—
" "	Def. Ord.	4	3½	4½	—	—	—	37,398	39,994	33,362
London, Chatham & Dover	Arb. Pf.	4	4½	4½	—	—	—	85,989	73,093	85,934
London Electric	Pref. ...	4	4	4	—	—	—	—	—	—
" "	Ord. ...	1½	½	1	20,000	8,000	8,000	12,303	11,547	1,086
Maryport and Carlisle ...	Ord. ...	5	5	6½	6,500	—	—	2,294	2,244	1,419
Metropolitan	Ord. ...	1	1½	1½	15,000	12,500	7,500	13,041	11,458	8,258
Metropolitan District ...	2 Pf. ...	3	2	2½	35,000	20,000	20,000	13,952	13,888	12,659
Midland	Pf. Ord.	2½	2½	2½	—	—	—	—	—	—
"	Def. Ord.	4	4	4½	200,000	200,000	200,000	142,339	131,442	141,329
Midland and S.W. Junction	B. Deb.	½	½	½		—	—	343	343	343
Neath and Brecon	Pref. ...	2½	2½	3½	—	—	—	2,111	79	243
North Eastern	Ord. ...	6½	6½	7	230,000	150,000	300,000	257,163	189,774	134,947
North London	Ord. ...	3½	3½	4½	5,000	—	—	8,138	6,223	6,917
North Stafford	Ord. ...	4½	4½	5	10,000	8,000	8,000	15,331	12,459	10,842
Port Talbot	Ord. ...	9	9	9	—	—	—	3,401	2,615	2,318
Rhondda and Swansea ...	Ord. ...	5	5	5	—	—	—	2,294	1,658	591
Rhymney	Ord. ...	8½	8½	9	2,000	4,000	6,000	2,915	3,724	3,237
South Eastern	Ord. ...	3½	3½	4	—	—	—	—	—	—
" "	Pf. Ord.	6	6	6	—	—	—	—	—	—
" "	Def. Ord.	1	1	2	—	—	—	3,014	7,817	4,199
Stratford and Midland ...	Ord. ...	—	1½	1½	—	—	—	—	734	504
Taff Vale	Ord. ...	3½	3½	4	—	—	—	19,958	14,021	9,174
SCOTLAND.										
Caledonian	Ord. ...	3½	3½	3½	—	—	—	29,294	22,307	22,081
"	Pf. Ord.	3	3	3	—	—	—	—	—	—
"	Def. Ord.	½	½	½	—	—	—	—	—	—
Glasgow, S.W.	Pf. Ord.	2½	2½	2½	—	—	—	—	—	—
"	Def. Ord.	1½	2	2½	—	—	—	18,722	21,973	11,022
Great North of Scotland ...	Pf. Ord.	3	3	3	—	—	—	—	—	—
" " ...	Def. Ord.	1	1	1½	—	—	—	6,683	8,159	9,039
Highland	Ord. ...	2½	2½	2½	4,000	2,000	—	—	—	16,713
North British	Pf. Ord.	3	3	3	—	—	—	—	—	—
" "	Def. Ord.	½	1	1½	20,000	20,000	40,000	32,189	34,195	48,804
IRELAND.										
Belfast and County Down ...	Ord. ...	6½	6½	6½	6,500	9,000	—	12,540	8,937	5,920
Cork and Bandon	Ord. ...	2½	3½	3½	1,620	2,500	2,500	4,467	3,827	3,530
Dublin and S.E.	Pref. ...	4	4	4	—	—	—	—	—	—
" "	Ord. ...	Nil.	½	1	5,000	—	8,000	10,020	12,463	10,232
Great Northern	Ord. ...	5½	5½	5½	—	—	—	65,020	60,460	44,723
Great S. and Western ...	Ord. ...	5	5	5	—	—	50,000	104,470	69,900	53,071
Mid. Gt. West.	Ord. ...	2	2	3	—	10,000	—	20,020	17,133	7,038

* Partly out of capital. † From reserve.

Digitized by Google

LONDON TRAFFIC IN 1913.

FROM A CORRESPONDENT.

The paper by Sir Albert Stanley on the above subject, which was presented at the International Engineering Congress held at San Francisco, and was published in THE TRAMWAY AND RAILWAY WORLD of February 10, affords much interesting information on the subject dealt with.

The author referred to the large increase in passengers carried by the London General Omnibus Company (taking the years 1911 and 1913) in comparison with that obtained by the London County Council, the figures being :—

London General Omnibus ... ... 107 per cent.
London County Council ... ... 1·3 per cent.

Further interest would have been afforded to those engaged in the transportation business if the article had contained information as to the number of omnibuses and miles run by the L.G.O., but these important details have apparently been studiously omitted. There is no doubt that a very large proportion of the 107 per cent. increase in the number of passengers carried has been due to the following causes :—

(1) To the persistently aggressive competition carried out by the L.G.O. against the London County Council and other Metropolitan tramway systems during the year mentioned.
(2) To the very considerable increase in the number of services operated, comparing 1911 and 1913.

In connection with this large increase in passengers carried it will be interesting to recall that it was stated in evidence before the Select Committee on Motor Traffic that the receipts per omnibus per annum had fallen from £1,508 in 1910 to £1,107 in 1913, a falling off of £400 per omnibus, and that the passengers had also fallen from 268,000 to 208,000, a decrease of 60,000 passengers per omnibus. It was admitted that if the omnibuses had been carrying as many passengers for the year 1913 as they were carrying in 1910, that "700 *fewer omnibuses* could have been done with."

This surely was a somewhat startling admission to make, and one that would appear to indicate that the real and only causes for the large increase mentioned were to be found in the views expressed in the foregoing paragraphs, and especially as far as No. 1 is concerned. What a needless expense have the authorities in the Metropolitan and adjacent areas been put to by the wholly unnecessary wear and tear of the roads by "the 700 fewer omnibuses which could have been done with."

With reference to the average receipt per L.G.O. passenger being 1·33d., and in comparison with that of 1·01d. per L.C.C. passenger, and to the statement that "Tramways are practically excluded from the central area for reasons based on the narrow thoroughfares," it is only by reason of this exclusion of tramways that the L.G.O. derive their higher average. The vast majority of the L.G.O. services—at one period of operation all but 15 out of 93—traversed through *some* portion of the central area, better known, perhaps, in some quarters as the "'Bus Paradise," and where the L.G.O. big dividends are undoubtedly earned.

Where omnibus routes coincide with tramway routes the rates of the various stages are practically identical. Passengers in the central area are in the habit of jumping on omnibuses for very short rides, chiefly owing to the difficulty of walking along the greatly congested pavements. In a large number of cases the distance ridden does not exceed a quarter of a mile, so that for the penny minimum fares—in comparison with the halfpenny fares charged on the L.C.C. cars—passengers are paying the L.G.O. at the apparent extortionate rate of 4*d. per mile*. In many instances the distance ridden does not exceed half-a-mile, when, similarly, the rate per mile is 2d., whilst those who ride for one mile pay at the rate of 1d. per mile.

The L.G.O. make no attempt to accommodate in respect of equitable fares these "short ride" passengers in the area where they have a monopoly. Had the L.G.O. average receipt per passenger been similar to that of the L.C.C., their revenue for the year under review would have been *less* by £749,508, and their profit of £296,758 would have been converted to a *loss* of £452,750. How extortionately are the omnibus passengers paying for the blessings of 'bus services.

It is thus clear why the L.G.O. average *is* greater than that of the L.C.C. At the same time, however, it is equally clear that, *unless* the L.G.O. obtained the all-round higher average, principally contributed in the central area (which is so far closed to the L.C.C., who would give cheaper fares), and considered to be far higher than that obtained by any other omnibus or tramway undertaking, they would be quite unable to charge the same fares as the tramways do where they are in competition with them.

The author refers to the comparative operating expenses per passenger for both undertakings, the figures being :—

London General Omnibus ... ... ·94d.
London County Council ... ... ·73d.

Included in the latter is, of course, a proportion in respect of track repairs. No allowance is included in the L.G.O. figures in respect of road maintenance ; if, therefore, a figure for such a charge was included, taken on the basis of three-eighths of a penny per omnibus mile, or such other charge as the Legislature has already imposed on motor omnibus operators *outside* the Metropolitan area, the expense per L.G.O. passenger would have been increased. As the figures are not on the same basis, they are, obviously, not strictly comparable.

When comparing the net result per passenger from omnibus and tramway operation :—

London General Omnibus ... ... ·39d.
London County Council ... ... ·28d.

it will be found that the former, notwithstanding their high average receipt per passenger, gain but a very small advantage over the L.C.C., the figures being 29·32 per cent. and 27·72 per cent. respectively. These figures prove that in view of their increased cost of operation the L.G.O. cannot afford to give the same facilities as those of the L.C.C.

London is not, as some would have us believe, pre-eminently the city of cheap transit ; it is, on the contrary in fact, the city of most expensive transit. This fact has never yet been adequately realised, and its consequences have not been in the least appreciated, because Londoners, instead of comparing the transit facilities with those of other towns—especially in some of the larger cities of the provinces—are content to pride themselves on the improved facilities they now enjoy in comparison with those they had to put up with ten or twelve years ago.

Reference is also made to the relative efficiency of the motor omnibus in comparison with that of the tramcar. It cannot be disputed that the tramways are the best means of conveying cheaply large numbers of people along the street. The public, as travellers, especially in the matter of fares, or ratepayers, in respect of the maintenance of the roadways used, derive more advantage from the operation of tramways than from any other form of surface transport.

The mobility of the motor omnibus is all very well, but what about the greater utility of the tramcar and its admittedly superior advantages in handling large volumes of traffic ? Can anyone imagine what the Embankment, for instance, would be like if motor omnibuses superseded the tramway car and had to handle the heavy traffic that is so effectively dealt with by that vehicle ? During slack hours of service the tramcar carries very much the same number of passengers as is carried by the omnibus at the same hours ; but when the traffic demands it, the tramcar provides 78 seats as compared with 34 by the omnibus.

Assuming it were economically possible for the omnibus to expand its services to meet the requirements of the traffic at the busy hours, the effect of the congestion in the streets would be very serious, and accidents would be very largely increased, as the omnibuses, for the carriage of a given quantity of traffic, would certainly occupy much more road space than the tramcars. A tramway car is 33 feet 10 inches in length, carries 78 persons, and a motor omnibus, 23 feet in length, carries 34 ; so that, obviously, two omnibuses would not carry as many persons as one tramcar. Allowing for the distance of 15 feet between the two omnibuses, the latter would occupy 61 feet of the street in comparison with 33 feet 10 inches occupied by one car carrying a somewhat larger number.

If the L.C.C. cars were entirely withdrawn, and the same seating accommodation had to be provided by omnibuses, as is now provided by the cars, 3,109 omnibuses, or an increase of 114 per cent. of vehicles over the number of tramcars, would be required during fine weather, whilst during inclement, when only inside seats of omnibuses are usable, 7,513 omnibuses, or an increase of 418 per cent., would be required. The effect of such a condition of affairs on street congestion and public safety would be appalling.

Take the L.C.C. Walworth route under normal conditions of working as a typical example. During the busy hours of each weekday not less than 80 omnibuses and 111 tramcars pass a given point in Walworth in one hour. If the electric cars were withdrawn, and the same accommodation were given by omnibuses, the result would be, on a dry morning, 318 omnibuses an hour, and on a wet morning, 655 omnibuses an hour. When these observations were taken there was a car every 128 yards ; with 318 omnibuses there would be one of these vehicles every 44 yards, whilst with 655 there would be an omnibus every 21 yards in each direction.

Again, a tramcar, with its great seating capacity, would cause much less obstruction in proportion to each passenger carried than any other vehicle using the streets. When the maximum service of cars is in operation, 542 cars an hour pass through the Elephant and Castle junction of routes. If omnibuses were used instead 1,162 of these vehicles an hour, *in addition* to the present omnibus service, would be required to give the same accommodation in fine weather, and 2,808 additional omnibuses an hour would be required in inclement weather.

With such a condition of affairs resulting from the possible operation of the greatly increased omnibus services, the streets would be totally unsafe for pedestrians, whilst the increased congestion would be too serious to contemplate.

The omnibuses do not perform in many ways the public services rendered by the tramways, yet they nevertheless contribute more materially than any other form of traffic to the danger of the public, and to the excessive wear and tear of the roadways, and for which, so far, they have escaped demands for contribution.

Digitized by Google

WOMEN AS DRIVERS.

THE GLASGOW EXPERIMENT.—LONDON SUGGESTION OPPOSED.

At a meeting of Glasgow Corporation on February 17, Councillor Montgomery, chairman of the Tramways Committee, was asked whether the experiment with women car drivers had been a success. Councillor Montgomery replied that the practice of the tramway department was to allow 30 days for motormen to qualify, and that course had been followed in the case of the women. That period had almost expired, and the experiment had been successful. The number of accidents with women drivers was not more than with men. A number of women had given up their situations as drivers, but not for the reason suggested, viz., that the work was too hard.

For some time the London police have been urged to license women as drivers of motor cabs in order to make good the shortage in those vehicles. The suggestion, however, does not find favour, mainly because the male drivers have enlisted under a pledge that their places would be kept open for them. On February 20 a meeting of the London and Provincial Union of Licensed Vehicle Workers, which includes some of the London female conductors, met at Euston Theatre and passed a resolution "protesting against the licensing of women to drive cabs, omnibuses, or tramcars, especially in view of the fact that there was no shortage of drivers, and that tramcar and omnibus drivers are classified in reserved industries." The resolution also expressed determination to assist the Government to bring the war to a successful issue, and instructed the officials to take steps to resist the introduction of women as drivers. No reliance is to be placed on reports that the Public Carriage Department at Scotland Yard are seriously considering the question of licensing women as tramcar and omnibus drivers. So far as can be ascertained it is a suggestion regarding motor cabs that has disturbed the Vehicle Workers' Union.

Several additional women are being trained as tramcar drivers in Doncaster.

WOMEN CONDUCTORS.

Nearly 300 women are at work or in training as conductors on the London County Council cars. Their presence is no longer restricted to the single-deck vehicles. They are to be seen on the double-deck single truck cars, on the trailers, and in pairs on bogie cars. Their uniform is probably the neatest to be seen on any traffic undertaking, comprising as it does a dark grey coat, skirt, and gaiters, and a black mackintosh hat with a brim all round. On the collar of the coat are the initials L.C.C.

The London United Tramways have nearly 100 female conductors at work. In the northern outer suburbs the Metropolitan Electric Tramways management employ women to the number of one-third of the conductors. Women conductors have also been introduced on the South Metropolitan cars. The Underground Railways employ 150 women as conductors, and 200 more are working as ticket collectors, booking clerks, porters, and lift attendants.

Thomas Tilling's Omnibus Company by the end of February were no longer the only London motor omnibus undertaking employing women to collect fares. The London General Company have had 70 in training for two weeks past, and are advertising for further candidates, although there is a choice of over 300 applicants a day. A large number of women conductors will be required, owing to several hundred men being about to join the army under the Derby recruiting scheme. Over 6,000 employees of the allied companies have already gone to the war. The women's uniform will comprise a long Norfolk jacket of blue cloth, trimmed with white piping, skirt of the same material reaching just below the knees, long cloth and leather gaiters, boots with low heels, blue soft felt "Alpine" hat with upturned brim at one side, trimmed with white piping, and L.G.O.C. badge and a mackintosh.

The *Manchester Guardian* records a great improvement in the manners of the trolley and bell boys on the tramcars, and attributes the change to the presence of the women conductors.

COUNTY COUNCILS AND ROAD MAINTENANCE.

NOT AN "OPPORTUNE TIME" FOR A JOINT COMMITTEE.

The Executive Council of the County Councils Association recently communicated with the Local Government Board pressing for the appointment of a joint committee of both Houses of Parliament to consider the question of the contribution by owners of motor omnibuses towards the upkeep of the roads traversed by those vehicles. Just prior to the war Mr. H. Samuel, President of the Board, promised to secure the appointment of such a committee.

At the annual meeting of the association on February 23, it was reported that Mr. Long, the new President of the Local Government Board, had forwarded a reply stating that he did not consider the present an opportune time for the appointment of the committee.

The report presented by the Executive Council mentioned that during the year the Highways Committee had considered the question of empowering county and county borough councils to make regulations with regard to motor omnibuses, motor chars-a-bancs, and similar vehicles plying for hire. They had also conducted negotiations with the Road Board and the Treasury in regard to grants and schemes, one result of which had been that the Treasury agreed to modify its decision that no grants from the Road Improvement Fund should be allowed for the year 1915-16, except for works already agreed to before the outbreak of war or required to meet serious unemployment.

One of the outstanding events of the year was "the appointment, as a result of the urgent representations made by the association, of the Departmental Committee on Locomotives and Heavy Motors (Damage to Roads), and the submission of detailed evidence by seven witnesses on behalf of the association."

CONDUCTORS' WINTER UNIFORMS.

The two photographs on this page show the two varieties of uniform supplied to the young women conductors and the inspector employed by Southampton Corporation Tramways Department.

Southampton Conductors Equipped for Rain.

Winter Uniforms for Fine Weather.

In the first picture the employees appear in overcoats and southwesters; the second depicts the fine-weather clothes. For each outfit there is a skirt, breeches, and puttees.

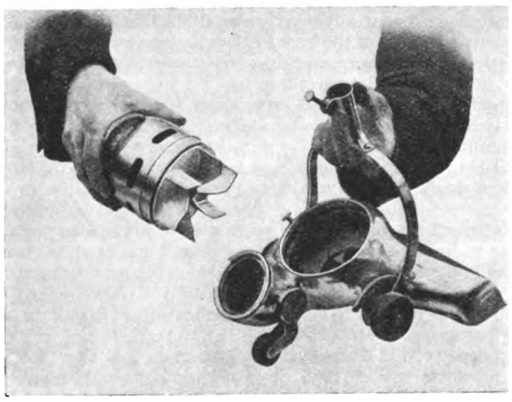
MOSCOW TRAMWAY REQUIREMENTS.

Moscow Council will shortly consider a proposal to add to their tramways rolling stock and to make an extension of the system. New workshops are to be built, and the total cost is expected to exceed one million roubles (£106,250). The Town Executive Committee proposes that the Council should buy American cars on easy terms, i.e., on the instalment plan—to the extent of 100 motor cars and 150 trailers.

Digitized by Google

THE PREMIER ELECTRIC SUCTION CLEANER.

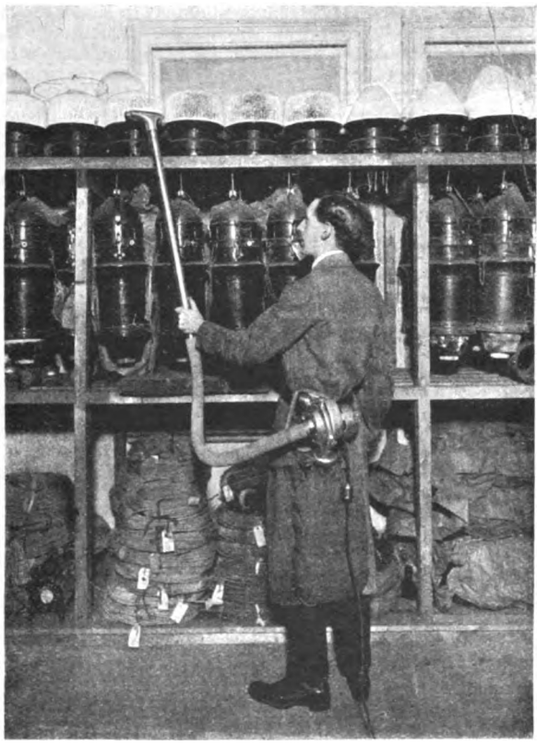
The Electric Suction Cleaner Company, of 56, Victoria Street, London, S.W., have made several notable improvements in their "Premier" electric cleaners for domestic service, and they have recently introduced a type of cleaner for industrial use that should find wide application in offices, workshops, stores, and tramway and railway car depots. The device has been found effective for switchboards, and is specially useful for cleaning filter cloths in turbine stations. By means of a specially-designed belt the machine



Motor and Fan Removed from Head of Cleaner.

and receptacle for the dust can be attached to the waist of the user, thus leaving both hands free, so that it can be used at the top of the ladder, or, if preferred, the cleaner can be carried by a substantial handle, as shown in the illustration below.

The machine consists of a high-speed vertical motor and fan contained in an aluminium case, and in its electrical features is similar to the "Premier" cleaner for domestic work. Special



Premier Electric Cleaner Attached to Belt of User.

attention has been paid to the designing of the blades of the fan, so that they might be given the best and most accurate form. The motor and fan are held by two set screws which permit the motor to be taken out and replaced by another in a few seconds. Careful tests by independent experts show that the suction in the domestic machine is equivalent to a little more than 10 in. water gauge, and it is still higher in the industrial machine. The motors are made for any voltages from 25 to 260, and from all periodicities from 25 to 133.

TRAMWAYS UNDER THE MUNITIONS OF WAR ACTS.

The following form (M.M.I.) has now been issued, and may be obtained by application to the Ministry of Munitions :—

Application to the Minister of Munitions to certify, in accordance with Section 9 (1) (d) of the Munitions of War (Amendment) Act, 1916, that the supply of tramway facilities by the undermentioned undertaking is of importance for the purpose of carrying on munitions work.

(1) Title and address of undertaking making application.
(2) Route mileage of the system.
(3) Total number of cars in service on an average weekday.
(4) Number of such cars (if any) which are necessary and used for the carrying of workpeople.
(5) Total number of cars in service on Saturdays.
(6) Total number of passengers carried on an average weekday.
(7) Average number of workpeople carried on an average weekday.
(8) Any estimate available of the number of munition workers included under (7).
(9) Average number of passengers carried on Saturdays.

NOTE.—The answers to questions (3) and (9) should be based upon the figures at the present period of the year.

(10) Number of tramway employees affected by the application.

Traffic Staff—
1. Drivers.
2. Conductors.
   (a) Male.
   (b) Female.
3. Other traffic employees.

Car Repair Shops—
1. Skilled men.
2. Semi-skilled men.
3. Labourers.

Permanent Way—
1. Skilled men.
2. Semi-skilled men.
3. Labourers.

Power Station—
(If the tramways undertaking supplies its own power).
1. Skilled men.
2. Semi-skilled men.
3. Labourers.

Car Sheds—
1. Skilled men.
2. Semi-skilled men.
3. Unskilled (a) men.
   (b) women.

Electrical Equipment—
(Linesmen, etc.).
1. Skilled men.
2. Semi-skilled men.
3. Labourers.

(11) Is it claimed that the whole of the tramway routes are used by and are necessary for the carrying of munition workers to and from their work ?
If not, state what portion of the tramway routes it is claimed should be certified.

(12) Is it claimed that the whole of the cars in daily service (including Saturdays) are necessary for carrying munition workers to and from their work ?
If not, state how many cars it is claimed are necessary.

(13) A map should be sent showing by distinctive colour—
(a) The tramway system which, it is claimed, should be certified.
(b) The principal munitions factories directly served by the undertaking.

(14) Give a list of the principal munitions factories served directly by the undertaking. (This should correspond, as far as possible, with those shown on the map referred to in the previous question.)
List of principal munitions factories served.

RESERVED OCCUPATIONS.

The following revised list of reserved occupations in connection with public utility services has been issued by the Board of Trade, together with a list showing the alterations made in the general reservations affecting all trades.

PUBLIC UTILITY SERVICES.

Electrical Generating Stations (including those for tramways and electric railways).—All classes of workmen.

Fire Brigades and Salvage Corps.—Men solely employed in connection with public fire brigades and salvage corps not to be called up without the consent of their chief officer.

Gasworks.—All classes of workmen inside the works.

Omnibuses.—Head of department ; foreman ; motor driver.

Tramways.—Traffic inspector ; driver ; chief storekeeper ; parcel superintendent.

Waterworks.—All classes of workmen engaged in the provision and distribution of water.

ALL INDUSTRIES.

Mechanics, etc.—Mechanics and other similar men engaged in the maintenance and repair of plant, machinery, and tools.

*Carters, Lorrymen, and Draymen (horse or power).—Employed by public carriers of goods by road, or by carting contractors in connection with railways, docks, wharves, and warehouses. Others, in all trades, not engaged in collecting from or delivering to private houses.

Coopers.—All classes (except those employed in making or repairing barrels or casks for beer, wine, or spirits).

NOTE.—The above refers to the Military Service Act, 1916.

* These reservations are in addition to the reservation of carters, lorrymen, and draymen under specified trades, viz., coal depots or wharves, flour mills, and in the home-grown timber trade.

Digitized by Google

STEAM RAILWAY ELECTRIFICATION.

Lancashire and Yorkshire Expenditure.

The annual report of the Lancashire and Yorkshire Railway Company shows, under the heading of capital account, the expenditure on the Liverpool to Southport, Manchester to Bury, and Bury to Holcombe Brook sections, which have been converted to electric working. On power stations, etc., the outlay up to December 31, 1914, was £392,804, and during 1915 £112,871 was expended, making a total of £505,676 on this head. Estimated further expenditure on capital account included £17,500 during the current year on the electrification of the Manchester and Bury line, and £6,500 subsequently; and £28,400 on electric power stations, etc., during 1916, and £5,500 subsequently. Under the heading of rolling stock, the particulars respecting trains worked by electric power, showed that the number of cars had increased during the past year from 174 to 210, and the carrying capacity from 13,616 seats to 16,552 seats.

Sir George Armytage, chairman of the Lancashire and Yorkshire Railway, stated at the annual meeting that the electrification of the Manchester and Bury line was almost complete, and at an early date the electric service would be instituted. When the full service was running it would be equal, if not superior, to any other service in the United Kingdom, both as regards speed and comfort. A full description of the work, accompanied by 56 illustrations, appeared in our issue of January 13.

London and North Western Suburban Scheme.

Particulars of the progress of the above work in the London area were given in the report of the engineer, which was included in the statement of the directors of the London and North Western Railway for the year ended December 31, 1915. The report mentioned that the bridges and tunnels for the junctions between the new electric lines and existing lines to Euston and Broad Street are in progress, and half the length of the iron-lined tunnels under Primrose Hill has been completed. The electric power station and repair shed at Stonebridge Park and six electric sub-stations are complete, and part of the plant has been installed, and the equipment of the new lines for electric traction between Willesden and Watford is in a forward state. The electrical equipment of the North London, Hampstead Junction, and North-South Western Junction lines, which form the through route between Broad Street in the City and Kew Bridge and Richmond, is being proceeded with, and the buildings for the sub-stations on these lines are complete.

Additional information was afforded by the speech of Sir Gilbert Claughton, Bart. (chairman), in moving the adoption of the report at the annual meeting on February 25. He stated that on the capital account they had expended during the year £832,462, including £143,500 advanced to the London Electric Company as part of the £1,000,000 which they agreed to lend that company in connection with the construction of the new extension of their line from Paddington to Queen's Park, the total amount now advanced being £542,416. Of the total amount expended on capital account £651,625 was in connection with the Euston and Watford Electric Railway. The further amount estimated to be expended this year was £928,000, of which £630,000 was in connection with that railway. The extension of the Bakerloo Tube to Queen's Park was opened in February of last year, and, pending the opening of the through route to Watford, arrangements were made whereby certain of the tube trains had, since May last, run through from Queen's Park to Willesden, where connection was made with main line and local London and North Western trains. If certain existing difficulties could be overcome, it was hoped to begin running electric trains between Broad Street and Kew and Richmond as from September.

North London Railway.

Further information relating to the electrification of the North London Railway was given in the remarks of Lord Rathmore (chairman) at the annual meeting on February 24. The work, he said, was part of the greater scheme for the conversion of the London and North Western suburban lines, but delay had arisen owing to the difficulties in obtaining electrical plant, and also with respect to technical labour difficulties, due principally to the war. Until the line was freed from the Government trains that now had to pass over it, they could hardly do more than work the existing services electrically. A more frequent service would be constantly interfered with. It was to the ultimate interest of the company that the electric service, when once started, should above all things be reliable, and not subject to interruption and consequent disappointment of the public. If the difficulties to which he had referred could be overcome as regarded the North London Railway, it was hoped that they might by September next be able to work the present services between Broad Street and Kew and Richmond by means of electric trains. It was to electric traction and the quicker and more frequent services that they would thus be enabled to provide—especially in the case of the through service between Broad Street and Watford—that they must look for a return in some measure of the great prosperity their railway formerly enjoyed.

L.B. and S.C. Suburban Lines.

The Earl of Bessborough made a gratifying announcement respecting the suburban electric railways of the London, Brighton, and South Coast Company at the annual meeting on February 23. He said that the main item of capital expenditure last year was the sum spent on the equipment of the suburban lines for electrical traction. The war necessitated a temporary suspension of part of this work, as well as certain rearrangements with the contractors, which would have the effect of prolonging the period within which the work was to have been completed. They were now, however, steadily proceeding with it in the hope that when normal conditions returned the scheme to which the proprietors had given their approval might be sufficiently far advanced to enable them to obtain at once some part, at any rate, of the benefit they had every reason to expect. The electric services were working most satisfactorily and giving excellent results. Last year there was an increase in the number of passengers carried by those services of nearly 70 per cent. over those carried in the last years of steam traction, and since the inauguration five years ago over 40 millions more passengers had been carried. The increase continued, as was demonstrated by the fact that the number carried last year was 15 per cent. higher than in 1914.

In the course of the discussion, Mr. M. Long said he understood that the electrification had been entrusted to a German firm. He would like to know if the contract had been completed or annulled, and he would like to express the hope that no future work connected with the line would be given to a German firm. (Hear, hear.)

The chairman replied that the electrification contract to which Mr. Long had referred was made with the Metropolitan Carriage and Wagon Company, and Messrs. R. W. Blackwell and Company. He did not, however, say that no more equipment would be obtained from Germany by the company or its contractors, but that may be taken for granted, we hope, for all time.

London and South Western.

Sir William Portal, presiding at the annual meeting of the London and South Western Railway on February 25, remarked that up to the end of last year they had spent £970,000 on the electrification of the suburban services. (The work was fully described in our issue of November 18, 1915, the description being accompanied by 61 illustrations.) As a result of the war, progress had been very slow, and it was not until October last that they had been able to start the section of the line from Waterloo to Wimbledon, *via* East Putney. A month ago they opened the "roundabout" service *via* Richmond and Kingston and the Shepperton line, and early in March the service to and from Hounslow would be commenced. There only further remained the service to Hampton Court and Claygate, completing the whole of the scheme they had in hand. Three or four months might elapse before they would be able to electrify the last two remaining services. This was due to delay in the completion of the power house which had caused them to conduct their work under serious difficulties, and one of the results was that they were getting a certain amount of overcrowding in the electric trains on the "roundabout" services during the rush hours. Comparing the week just prior to the opening of the "roundabout" electric with the second week after the service commenced, there was an increase of 16 per cent. in the bookings.

LONDON ELECTRIC RAILWAYS.

Metropolitan Railway.—At the annual meeting of this Company on February 10, a shareholder asked if the company (which is not connected with the allied traffic undertakings) could not come to an arrangement with the competing omnibus companies.—The Chairman (Lord Aberconway) replied that the directors had tried in every possible way to induce other companies to put up their fares to a point which was reasonable and commensurate with the capital cost of the undertaking. That was the only way in which they could put up fares. Wherever their line went, there was a line of omnibuses going along the road, paying nothing for rates and having free use of the street, and keeping down fares to the lowest point. The County Council were the people most to blame. They ran their tramcars and cut the fares down to a ridiculous point. The motor omnibuses followed suit, and this company had to come in at the rear.

A dividend of 1 per cent. for the year on the ordinary stock was declared.

Central London.—At the annual meeting on February 24, Lord George Hamilton (chairman) referred to the agreement for constituting a common fund between this and other companies. The gross receipts of the company in 1915 were £316,527, an increase of 14·11 per cent., and the expenditure had increased by £12,164, or 8·43 per cent. The appropriation to reserve was £10,000, and they hoped to set aside a similar sum in future years. The capital expenditure of £35,440 was chiefly due to the new works in connection with the Ealing Extension Railway. The balance available for dividend was £105,685. An interim dividend of 1½ per cent. was paid on the ordinary stock and 2 per cent. on the preference ordinary stock, and the directors now recommended a further

Digitized by Google

payment of 1½ per cent. on the ordinary shares, of 2 per cent. on both the preferred and deferred ordinary, leaving £15,685 to be carried forward.

London Electric.—Lord Farrer, presiding at the annual meeting on February 24, after explaining the pooling arrangement entered into by this and other companies, said that this company's proportion for the year under review was 26 per cent., and for 1916 it would be 30 per cent., unless unforeseen circumstances should make an alteration necessary. The gross receipts were £963,131, an increase of £181,186. A large part of this was due to the Queen's Park extension and to increased traffic on the Charing Cross extension, with its new arrangement of interchange escalators; and also to the general increase of traffic due to the reduced means of transit in the streets. The Queen's Park extension was a prolongation of the Bakerloo tube from Paddington to join up with the London and North Western Railway between Euston and Willesden. There was a 15-minute service from Willesden to the Elephant and Castle. It was proposed to extend this service to Watford when circumstances permitted. The expenditure had increased by £83,300. The balance available for dividend on the ordinary shares was £128,902, an increase of £59,055. An interim dividend of ½ per cent. had been paid, and the board now recommended the payment of a further dividend of ¾ per cent. This was a higher dividend by ¼ per cent. than had been paid before.

Metropolitan District.—In his remarks at the annual meeting on February 24, Lord George Hamilton (chairman) said that the expenditure upon the electrification had been very much larger, and the receipts during the earlier years of the changed system of working very much less, than was anticipated. The railway had been resuscitated entirely by the exertions of Sir George Gibb, Sir Edgar Speyer, and Sir Albert Stanley—who had brought the railway up until there had been an absolute change in every way—in its material condition, in the service it rendered, and in its financial position. The policy adopted might be summed up in two sentences—individual expansion inside and unification outside. In moving the adoption of the report, his lordship stated that their proportion of the common fund under the pooling arrangement was 12 per cent. If for any cause the takings of any company should not be sufficient for such purposes, the deficiency would become the first charge on the common fund. It would therefore be appreciated how very materially the position of the prior stocks of this company was improved by this agreement. The common fund for 1915 was no less than £451,000; in other words, the aggregate net earnings of the five companies must shrink by at least that amount before the interest on the prior stocks of the company could be affected, and this was a very unlikely contingency. In further remarks, the Chairman alluded to the increase in the dividend for the year on the second preference stock from 2 per cent. to 3 per cent., and referring to the staff he said that, generally speaking, the work which was being done by the women in the company's employ was satisfactory.—Sir Charles Dalrymple, Bart., seconded the motion.—Sir Robert Perks congratulated the management upon carrying such a large number of people—over 100,000,000, according to his estimate—during the past year, notwithstanding the undoubted difficulties which had had to be faced. The fact that the gross revenue now exceeded a million sterling seemed to mark a satisfactory step in the progress of the company. Ten years ago, when he last occupied the chair, they were looking forward to reaching that standard at a very much earlier date, and it had been a deep disappointment to all the ordinary stockholders, as well as to the Underground Company, which held so much of the preference stocks of this company, that they had had to wait so long for their anticipated return. To some extent this was due to the fact that they had not done what he, as chairman, in the Parliamentary Committee Rooms assured Parliament they were going to do, and what they obtained Parliamentary authority to do, namely, charge a reasonable figure, instead of the "cut-throat" prices they at present charged. He hoped this question would be seriously considered.—In reply, the Chairman said he might fairly say that they were approximating nearer and nearer to the period at which the possibility of a dividend on the ordinary stock might become likely. Meantime the ordinary stockholder, by the making of a considerable reserve, was benefited at the expense of the second preference. He wished to utter a word of warning on the question of fares. The District was now part of a great organisation which to a very large extent had control of the passenger traffic of London. In consequence of the District fitting into that organisation, its traffic had improved and its receipts had been augmented. They had to be very careful about raising fares, because if they raised them they would strike at the foundation of the success of the undertaking. They had arrived at their present position largely owing to the excellence and cheapness of the service. Looking, however, to the rise in the cost of petrol, coal, and wages, the time might come when in self-defence they would be compelled to raise their fares.

Stoppage at Birmingham.—The coal stocks at the power station having been practically exhausted because of the adverse weather interfering with the transport arrangements, the tramways service was suspended for an hour on February 28.

DUBLIN UNITED TRAMWAYS.

A Record Year.

The annual meeting of the Dublin United Tramways Company was held on February 8, Mr. W. M. Murphy presiding. The report recommended a dividend at the rate of 6 per cent. per annum, less income-tax, on the preference shares for the half-year ended December 31; a final dividend at the rate of 5 per cent. per annum, less income-tax, on the ordinary shares for the half-year; and that £18,000 be set aside towards renewal of rails, and £5,000 to reserve and renewals. The carry forward is £13,045. The financial statement was given in our issue of February 10, together with the corresponding figures for the years 1914 and 1913.

In moving the adoption of the report, the Chairman referred to the death of Mr. R. S. Tresilian, secretary; Mr. C. W. Gordon, manager; and Captain C. Colthurst Vesey, one of the directors. Mr. Tresilian was forty years in the tramway service of Dublin. He was a man of exceptional ability. Eighteen years' experience of Mr. Gordon, associated with him as he was, gave him sufficient opportunities to appreciate his fine qualities. He controlled at different periods undertakings owned by the Tramways Union (a London company) in European cities from Madrid to Bukarest. The late Captain Vesey as a director was most helpful. Mr. Laurence Waldron's accession to the board would greatly increase its strength. They would see in the report the rearrangements in the *personnel* of the staff, and he did not think there could be any higher tribute to the efficiency and organising capacity of their departed friends than the fact that the board were able to find amongst their subordinates men well trained to fill every position in a most satisfactory manner. The directors had power to appoint a general manager, and to that position, which was a new one, they appointed Mr. G. M. Harriss, who had been the electrical engineer since 1911. Mr. Harriss was engineer to the International Exhibition of 1907, and as chairman of the Working Committee of the Exhibition he (Mr. Murphy) had opportunities of appreciating his resourcefulness and versatility. He asked him to go to West Africa, where he was building a railway, but recalled him to take up the position of electrical engineer vacant by the death of Mr. Sheardown. Mr. Harriss was already justifying his judgment in his appointment as general manager. Mr. M'Hugh, the secretary, had been chief accountant, and Mr. Brophy, traffic manager, was chief clerk to Mr. Gordon. Both these gentlemen were giving the utmost satisfaction. It could not fail to have a good effect on the service generally when men found that their promotion was not indefinitely postponed by the importation of outsiders to the higher positions. He ventured to say that there was no tramways undertaking with a more competent staff than that by whom this company were served. Dealing with the balance sheet, the Chairman said there was an item of £332 for new wagons to work the growing goods traffic, which showed an increase of £323. This was earned at an additional cost of £83. The gross receipts, the largest yet recorded, were £333,899, against £321,896. Of this increase £11,677 was due to passenger traffic. The parcel traffic continued to grow, the increase being £337. The gross expenses exceeded those of 1914 by £18,143, which included war allowances amounting to £4,536. The increase in expenses was greater by £6,140. In "operation" there was an increase of £4,161. The average cost of 24,000 tons of coal consumed was 3s. a ton higher, being 18s. 5d. They had contracted for enough coal to carry them through this year, but at a higher price. The greatest increase came under that of "maintenance," and amounted to £10,154. Of this nearly £6,000 was incurred on road and track maintenance, and £2,700 represented car motors and electrical car equipment. He expressed regret that at this time of national crisis the Corporation were altering the levels of some roadways, thus necessitating the relaying of certain tramways at a cost of £1,727. These roadways could have answered their purpose for a few years longer, or at least until the present prices of all kinds of material had come down. Wages under the head of "traffic expenses" were up by £3,909, of which £2,632 was due to war bonus and separation allowances, and some more of it to the manning of cars for an addition of 200,000 car-miles run in excess of 1914. There was a decrease of £2,394 in the item of "law and compensation"; an increase of £1,371 in rates and taxes, and a net decrease of £890 in "general charges." The result of the working for the year 1915 was a profit of £124,516, which, with £11,366 from last account, and £1,902 interest on investments, gave £137,784 at credit of net revenue account to meet the standing charges, dividends, and appropriations. After paying the standing charges, a sum of £95,845 remained. Last year they appropriated £18,000 out of the balance on revenue account to the renewal of permanent way fund, which brought that fund up to £40,490. During the year they expended £16,214 on renewals of rails, reducing the reserve for this purpose to £24,276. They proposed now to appropriate £18,000 out of the profits to the same fund for renewals, which would bring it up again to £42,275, or £1,785 more. The new rails were 105 lb. to the yard, replacing 92 lb. rails, which should give the renewed lines a longer life. They started the new year with an increase of traffic of more than £2,000 for the month of January.

Digitized by Google

BRISTOL TRAMWAYS COMPANY.

A Successful Year.—Increasing Motor Business.

The report of the Bristol Tramways and Carriage Company, Limited, for the year ended December 31, 1915, shows that the gross receipts for the year amounted to £512,385, and the working expenses and renewals to £413,521, leaving a net revenue of £98,864. After making provision for debenture interest, preference dividend, etc., as shown in the appended summary, the balance available for appropriation is £37,680, out of which a final dividend has been paid for the half year at the rate of 6 per cent. per annum (subject to income tax), making 5 per cent. for the year. An addition of £20,000 has been made to reserve for contingencies and renewals, and £5,055 has been carried forward to the next account. The receipts of the tramway department show an increase of 3·63 per cent., and those of the carriage department an increase of 23·39 per cent. The number of passengers carried during the year on the cars and motor omnibuses was 60,272,400, an increase of 1,970,815.

Results for the Past Three Years.

	1915	1914	1913
	£	£	£
Receipts—			
Tramways department ...	248,355	239,651	243,686
Carriage department ...	258,530	209,512	174,701
Sundry receipts	5,500	5,611	5,429
Total receipts	£512,385	£454,774	£423,816
Expenditure—			
Traffic expenses	175,415	174,623	164,810
General expenses	75,916	58,947	49,274
Renewals, repairs, and maintenance	162,189	138,615	129,498
Total expenses ...	£413,520	£372,185	£343,582
Net revenue	£98,865	£82,589	£80,234
Interest on debentures	30,502	30,638	27,443
Interest on investments (carried to reserve fund)	4,364	4,468	4,408
Dividend on 4 per cent. Pref. shares	17,333	18,458	18,833
Dividend on Ord. shares (5 per cent.)	21,610	20,724	21,188
Reserve fund for renewals ...	20,000	8,301	8,362
Carried forward	5,056	—	—
	£98,865	£82,589	£80,234

Since the beginning of the war, no fewer than 1,095 men in the company's employment have joined His Majesty's Forces, including 247 trained motor drivers, and a further number of 702 men have attested under Lord Derby's scheme, together about 90 per cent. of the total number of the eligible employees not actually engaged in munition work. To those employees on active service, who were with the company at the outbreak of war, and who had families or relatives dependent upon them, weekly allowances have been paid, and such allowances during the year amounted to the sum of £11,737. The depletion of the staff owing to recruiting has necessitated some restriction of the company's public services, but every effort has been made to reduce inconvenience to the public to the minimum. Notwithstanding the exceptional conditions which have prevailed during the year, the traffic receipts of both the tramways and carriage departments have increased. A much-needed motor omnibus service between Tewkesbury and Cheltenham has been inaugurated, but the opening of other contemplated new motor omnibus services in Bristol and other districts remains in abeyance during the war.

The motor constructional works and the tramway rolling stock works at Brislington have been largely employed throughout the year in the production of war munitions, including the making of aeroplane parts and fittings, and the construction and repair of motor workshops and motor lorries for the army.

During the year communications have passed between the Bristol Corporation and the company as to the former's option of purchasing the company's tramway undertaking, but without any result. As the Treasury has refused its consent to any public issue of stock by the Corporation for the purpose of tramway purchase, the directors offered, in order to remove the difficulty, to recommend the shareholders to approve the purchase price being satisfied by the issue of Corporation stock to return one-half per cent. more than the market yield of the Government stock at the date of the award, this being the relative difference in the respective stocks in normal times.

The extension of the company's memorandum of association, to include the execution of Government and other contracts, and the addition of new departments embracing the manufacture of aircraft, war material, and supply of electricity and other matters, which was approved by extraordinary general meetings of the company, received the sanction of the court on July 13 last. The Bill promoted by the company in the last session of Parliament to extend the powers not yet exercised for the acquisition of land and construction of tramways received the Royal Assent on June 24 last.

The directors record with extreme regret the death in April last of Mr. Hugh Greenfield Doggett, who had been associated with the company from its earliest years, and had been a director for the past five years. Mr. George Stanley White has been elected to fill the vacancy thus created.

ADELAIDE MUNICIPAL TRAMWAYS.

In our issue of May 13, 1915, some description was given of the progress of the tramway undertaking of the Adelaide Municipal Trust, which since its inception has been directed by Mr. W. G. T. Goodman, M.Inst.C.E., M.I.E.E., as chief engineer and general manager. The chairman of the Trust is Mr. Alex. B. Moncrieff, C.M.G., M.Inst.C.E., and the secretary Mr. Chas. R. Moyes. In addition to the chairman, the Trust consists of seven members, and the work is carried out under the supervision of the following committees :—

Finance—Messrs. Thos. Gill (chairman), Frank B. Moulden, and Arthur C. Sanders.

Traffic and Works—Messrs. H. J. Holden (chairman), R. Cruickshank, I. Isaacs, and H. Sherriff.

Comparative statistics were given in the previous notice for each half year from July 31, 1907, to July 31, 1914, and we now append similar statistics for the half years ended January 31 and July 31, 1915, within which periods the Port Adelaide horse tramway system has been included in the undertaking and operated during its conversion to electric traction.

The Government of South Australia has advanced to the Trust on account of debenture capital £1,516,225, for the electrical equipment of the undertaking, and repayments have been made from the sinking fund to the extent of £155,306, and on July 31, 1915, the reserves were as follow :—Reserve for renewals account, £87,364 ; for insurance accounts, £8,307 ; balance carried forward, £4,486.

The net revenue for the half year on working was £57,795, and the standing charges amounted to £62,390, leaving a deficit for the half year of £4,595. A considerable proportion of the deficit is due to the operation of the horse-car service of Port Adelaide during its conversion to electric traction, and to works of extraordinary revenue expenditure on permanent way (neither of which losses was due to the operation of the system), and to a contribution to war funds, i.e., wages paid to dependants of employees who have enlisted for active service, amounting to £906. The gross revenue was £153,283, or £11,420 less than for the corresponding half year ending July 31, 1914, and £18,000 less, it is estimated, than the revenue for the half year would have been had the economic conditions remained normal. The entire capital cost of the revenue earning portion of the electric traction system, excluding purchase money and stores, was £1,399,996. The surplus revenue over operating expenses (excluding the Port Adelaide horse car account) was £58,206, the percentage of working expenses to revenue being thus 61·926 per cent. In addition to meeting the whole of the obligations to date, the whole of the interest on purchase money (£83,096) has been paid.

During the half year ended July 31, 1915, the Morialta and the Goodwood extensions and the Millswood sub-way were completed, in addition to several contracts for the electrical equipment of the Port Adelaide tramways.

	Half-year ended Jan. 31, 1915	Half-year ended July 31, 1915
Revenue.		
Electric traction—		
Traffic receipts	£154,942	£150,213
Sundry receipts	£1,719	£2,586
Horse traction (Port Adelaide)		
Traffic receipts	£110	£408
Interest	£378	£76
Total revenue	£157,149	£153,283
Expenditure and Appropriation.		
Total operating expenses	£96,581	£95,488
Reserve for renewals	£8,687	£8,678
Interest on purchase money	£4,387	£4,367
Interest on advance for construction ...	£26,381	£26,012
Sinking fund	£22,976	£23,333
Total expenditure and appropriation ...	£159,012	£157,879
Debit balance	£1,862	£4,595
Revenue per car mile	15·020d.	15·254d.
Expenses per car mile	9·220d.	9·447d.
Ratio operating expenses to revenue ...	61·386%	61·926%

Digitized by Google

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track). Mls.	Chs.	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Other.	Total.
Aberdeen ..	*May 31, 1915	Dec., 1899	E.	27	56	415,000	366,332	48,668	366,332	13,225	184,118	234,194	189,803	86,614	1,388	88,002
Accrington ...	Mar. 31, 1914	Aug., 1907	,,	10	53	181,925	133,875	48,050	134,734	12,636	113,870	20,864	16,581	29,843	350	30,193
Ashton-u-Lyne..	*Mar. 25, 1915	Aug., 1902	,,	8	15	130,070	111,376	18,694	111,376	13,599	66,708	36,236	3,200	22,577	343	22,920
Ayr	*May 15, 1915	Sept., 1901	,,	9	30	128,000	98,630	29,369	100,705	10,742	78,770	27,866	17,649	17,181	804	17,985
Birmingham ..	*Mar. 31, 1915	Jan., 1904	,,	118	71	2,858,935	2,437,104	421,831	2,472,938	20,801	1,940,158	496,946	176,726	640,091	6,923	647,014
Blackburn .	*Mar. 25, 1915	Mar., 1899	,,	24	63	408,174	342,474	65,700	336,258	13,566	354,600	191,985	3,718	65,158	3,144	68,302
Blackpool .	*Mar. 31, 1915	June, 1899	,,	(p)21	51	460,473	316,005	144,468	316,005	14,604	316,005	138,577	19,698	75,344	761	76,105
Bolton	*Mar. 31, 1915	Dec., 1899	,,	47	69	551,092	551,092	Nil	570,981	11,930	348,111	202,980	43,059	140,182	1,228	141,410
Bradford ..	*Mar. 31, 1915	July, 1898	,,	h118	9	1,280,788	1,043,788	237,000	1,043,054	8,831	634,618	439,321	75,208	309,320	20,568	329,888
Brighton	*Mar. 31, 1915	Nov., 1901	,,	17	15	378,093	279,978	98,115	280,392	16,314	211,268	69,124	7,562	54,413	2,113	56,526
Burnley	*Mar. 31, 1915	Dec., 1901	,,	22	18	388,052	326,077	61,975	232,580	10,465	170,852	72,664	29,550	77,161	1,306	78,467
Burton-on-Trent	*Mar. 31, 1915	Aug., 1903	,,	10	50	108,632	104,562	4,070	106,275	10,121	47,788	56,784	10,134	15,223	1,510	16,733
Bury	*Mar. 31, 1915	June, 1903	,,	(b)36	10	407,800	284,745	123,055	293,237	12,826	254,832	55,416	33,960	68,740	276	69,016
Chester	*Mar. 25, 1915	April, 1903	,,	6	35	92,991	82,380	10,611	82,934	12,883	66,977	16,059	8,072	12,935	317	13,252
Chesterfield .	Mar. 31, 1914	Dec., 1904	,,	5	8	98,000	73,500	24,500	69,810	13,663	57,660	13,820	6,307	13,608	465	14,073
Colchester ..	*Mar. 31, 1915	July, 1904	,,	7	75	70,748	69,555	1,193	69,471	8,736	48,360	22,007	Nil.	13,413	380	13,793
Croydon	*Mar. 31, 1915	(q) Sept., 1901	,,	17	50	287,689	287,689	Nil	286,765	16,271	222,223	107,039	41,643	87,833	781	88,614
Darlington ..	*Mar. 31, 1915	June, 1904	,,	8	71	107,500	77,889	29,611	8,748	77,870	55,236	25,881	7,369	13,451	261	13,712
Darwen	*Mar. 31, 1915	Oct., 1900	,,	7	13	93,400	86,300	7,100	87,199	12,174	51,200	33,555	9,396	14,645	988	15,633
Derby	*Mar. 31, 1915	July, 1904	,,	22	27	...	...	...	248,373	11,113	...	74,267	(r)38,410	51,903	978	52,881
Doncaster ..	Mar. 31, 1914	June, 1902	,,	12	58	...	...	...	107,921	8,481	94,700	16,581	1,442	22,890	318	23,208
Dundee	*May 15, 1915	July, 1900	,,	28	32	(f)	362,789	...	371,145	13,068	266,027	96,762	92,694	66,320	1,954	68,274
East Ham ..	*Mar. 31, 1915	June, 1901	,,	14	16	192,270	191,016	254	196,309	13,824	129,336	78,806	...	59,552	680	60,232
Exeter	*Mar. 31, 1915	April, 1905	,,	7	0	106,000	88,818	17,182	88,818	12,688	67,966	21,360	6,420	17,964	55	18,019
Gloucester ...	*Mar. 31, 1915	April, 1904	,,	15	1	191,000	144,333	46,667	147,783	9,846	104,965	22,901	1,000	16,693	1,114	17,807
Halifax	*Mar. 31, 1915	June, 1898	,,	55	39	449,263	417,466	31,797	420,185	7,570	283,249	129,670	36,442	111,792	1,378	113,170
Ilford	*Mar. 31, 1915	Mar., 1903	,,	12	49	152,883	152,883	Nil	149,574	11,859	102,839	50,043	3,239	31,539	442	31,981
Ilkeston	Mar. 31, 1914	May, 1903	,,	3	56	64,214	47,000	17,214	47,833	13,436	31,462	16,422	...	6,915	171	7,086
Ipswich	*Mar. 31, 1915	Nov., 1903	,,	14	70	116,471	114,300	2,171	115,676	7,776	94,894	115,549	15,940	22,796	493	23,289
Keighley	*Mar. 31, 1915	Oct., 1904	,,	6	9	50,934	47,711	3,223	...	...	26,936	20,774	...	8,957	296	9,253
Kilmarnock ..	*May 15, 1915	Dec., 1904	,,	5	47	65,000	52,795	12,205	52,801	9,450	46,450	10,078	6,618	8,416	201	8,617
Kirkcaldy ...	*May 15, 1915	Feb., 1903	,,	8	65	213,000	97,868	115,132	97,868	11,105	76,466	21,402	5,223	16,564	412	16,976
Lancaster ...	*Mar. 31, 1915	Jan., 1903	,,	4	65	...	45,700	...	43,711	9,083	28,750	17,669	3,342	5,534	159	5,693
Leith	*May 15, 1915	Aug., 1905	,,	17	73	275,000	238,000	37,000	237,983	13,286	171,500	66,070	6,604	36,298	1,086	37,384
Leyton	Mar. 31, 1914	Dec., 1906	,,	18	8	324,201	324,145	56	295,376	16,319	240,741	57,244	2,654	69,148	1,541	70,689
Lincoln	*Mar. 31, 1915	Nov., 1905	S.	2	77	98,519	44,947	53,572	44,987	15,185	40,226	12,529	(l) 692	6,435	117	6,552
Liverpool ...	Dec. 31, 1914	Nov., 1898	E.	124	0	2,622,786	2,057,850	564,936	2,062,391	16,741	1,168,685	1,177,949	366,545	684,026	13,050	697,076
Lowestoft ...	Sep. 30, 1914	July, 1903	,,	4	6	96,230	91,178	5,052	91,178	22,375	75,480	17,614	Nil	11,357	373	11,730
Maidstone ...	*Mar. 31, 1915	July, 1904	,,	7	3	82,932	82,932	Nil	79,398	11,282	63,598	19,334	...	10,402	602	11,004
Manchester ...	*Mar. 31, 1915	June, 1901	,,	203	31	2,361,038	2,207,215	153,823	2,216,009	10,895	1,648,183	548,499	438,497	887,763	14,112	901,875
Nelson	*Mar. 31, 1915	Feb., 1903	,,	3	69	38,000	37,885	115	37,885	9,808	28,086	9,799	...	9,300	52	9,352
Newport (Mon.)..	*Mar. 31, 1915	April, 1903	,,	14	28	232,500	196,250	36,250	196,184	13,671	155,216	49,868	3,479	41,752	952	42,704
Nottingham ...	*Mar. 31, 1915	Jan., 1901	,,	44	20	...	...	...	733,674	16,586	473,999	261,364	56,626	176,289	3,026	179,315
Oldham	*Mar. 25, 1915	May, 1902	,,	28	32	506,723	446,347	60,376	453,655	15,981	303,738	166,268	2,222	111,679	2,135	113,814
				(b) 8	31											
Perth	May 15, 1914	Nov., 1913	,,	6	75	90,000	78,350	11,650	78,629	11,334	...	...	...	8,944	928	9,872
Plymouth ...	Mar. 31, 1914	Sept., 1899	,,	15	0	182,856	181,479	1,377	219,417	14,628	86,903	89,493	24,252	39,989	891	40,880
Pontypridd ...	*Mar. 31, 1915	Mar., 1905	,,	8	50	137,847	137,839	8	138,568	17,321	107,403	30,436	Nil	22,819	427	23,246
Rawtenstall ...	*Mar. 31, 1915	May, 1909	,,	15	71	193,290	182,172	11,118	182,276	11,709	150,324	31,848	3,051	24,460	1,076	25,536
Rochdale... ...	*Mar. 31, 1915	May, 1902	,,	(i) 40	2	356,991	347,782	9,209	353,200	15,407	347,782	108,034	16,000	77,660	5,742	83,402
Rotherham ..	*Mar. 31, 1915	Jan., 1903	,,	12	2	342,200	188,326	153,874	184,178	15,316	150,485	39,473	21,771	43,834	59	43,893
			R.T	...		...	...	...	...	...	...	...	...	...	...	...
Salford	*Mar. 31, 1915	Oct., 1901	E.	75	64	1,086,472	723,717	362,755	725,485	9,571	511,853	282,115	30,058	257,935	42	257,977
Southampton ...	*Mar. 31, 1915	Jan., 1900	,,	18	54	280,452	260,699	19,753	259,834	13,913	158,729	99,470	14,251	68,042	2,996	71,038
Southend-on-Sea	Mar. 31, 1913	July, 1901	,,	11	49	130,000	129,961	39	143,808	12,384	116,940	12,784	3,045	34,453	465	34,918
Southport ...	*Mar. 31, 1915	July, 1900	,,	(d) 10	63	292,000	197,730	94,270	196,178	8,424	67,250	57,870	442	19,970	450	20,420
South Shields ...	*Mar. 31, 1915	Mar., 1906	,,	10	21	251,882	184,056	67,826	181,097	17,646	155,214	37,314	30,837	39,275	570	39,845
Staly'ge, H., M., D.	*Mar. 31, 1915	May, 1904	,,	27	57	325,270	280,990	44,280	279,778	10,096	209,387	71,603	1,211	37,490	130	37,620
Stockport ...	*Mar. 31, 1915	Aug., 1901	,,	27	5	318,847	234,500	84,347	265,014	9,789	155,686	92,313	37,776	(a)65,533	1,203	66,736
Sunderland ...	*Mar. 31, 1915	Aug., 1900	,,	20	28	308,699	303,211	5,488	306,766	15,074	161,996	132,265	45,044	75,229	386	75,615
Swindon	Mar. 31, 1914	Sept., 1904	,,	4	42	...	...	...	44,216	9,771	33,861	11,738	7,237	8,602	309	8,911
Wallasey ...	*Mar. 31, 1915	Mar., 1902	,,	19	77	208,867	195,290	13,577	222,027	11,122	159,306	72,879	10,612	63,690	815	64,505
Walsall	Dec. 31, 1914	Dec., 1902	,,	19	44	188,145	188,100	45	182,926	9,357	154,044	63,649	34,960	33,311	778	34,089
Walthamstow ...	*Mar. 31, 1915	June, 1905	,,	13	30	198,000	194,000	4,000	190,477	14,251	168,248	25,249	...	41,346	443	41,789
Warrington ...	*Mar. 31, 1915	April, 1902	,,	9	52	103,674	102,896	778	102,128	10,583	67,028	35,869	7,977	22,631	261	22,892
West Ham ...	*Mar. 31, 1915	Feb., 1904	,,	30	4	578,478	551,588	26,890	556,878	18,532	469,051	123,888	26,236	147,703	4,509	152,212
West Hartlepool	*Mar. 31, 1915	Feb., 1904	,,	8	63	85,494	80,330	5,164	81,731	9,301	76,501	3,682	4,614	19,011	494	19,505
Wigan	*Mar. 31, 1915	April, 1901	,,	30	73	502,513	491,007	11,506	481,577	15,579	382,490	157,287	5,034	75,270	2,107	77,377
Wolverhampton	*Mar. 31, 1915	April, 1902	S.	21	40	279,733	268,185	11,548	292,361	13,596	209,497	71,812	53,987	54,593	730	55,323
Yarmouth (Gt.)...	*Mar. 31, 1915	June, 1902	E.	14	58	149,600	124,750	24,850	126,453	8,588	115,700	29,148	9,613	21,872	494	22,366
York	*Mar. 31, 1915	Jan., 1910	,,	12	20	157,150	...	...	163,884	...	151,039	8,596	6,456	29,589	538	30,127

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	*Mar. 31, 1915	Nov., 1905	E.	98	54	1,528,146	1,381,200	136,946	1,455,506	14,702	1,343,000	257,730	96,622	266,249	3,988	270,237
Bexley	Mar. 31, 1914	Oct., 1903	,,	6	42	100,798	98,812	1,986	98,408	15,376	75,408	23,403	942	14,698	1,649	16,346
Birkenhead	*Mar. 31, 1915	Feb., 1901	,,	24	7	378,973	373,290	5,683	373,545	15,548	228,391	143,241	23,062	65,100	685	65,785
Bournemouth ...	*Mar. 31, 1915	July, 1902	,,	(e) 32	67	...	...	...	467,073	18,379	291,667	168,818	17,769	101,882	464	102,346
Cardiff	*Mar. 31, 1915	May, 1902	,,	31	66	832,356	787,292	45,064	811,043	25,484	485,049	302,242	98,778	139,256	36,785	176,041
Coventry ...	*Mar. 31, 1915	Jan., 1912	,,	15	61	251,014	238,355	12,659	238,803	15,151	229,235	14,363	4,095	44,633	771	45,404
Glasgow	*May 31, 1915	Oct., 1898	,,	198	10	4,564,266	3,694,143	870,123	3,751,708	19,127	2,411,868	1,282,275	2,326,543	1,070,694	6,184	1,076,878
				(b) 2	53											
Huddersfield ...	*Mar. 31, 1915	Feb., 1901	,,	56	4	772,662	467,142	305,520	477,919	8,526	281,927	194,599	7,522	124,200	2,859	127,059
Hull	*Mar. 31, 1915	July, 1899	,,	33	12	662,074	594,626	67,448	596,092	17,982	579,628	183,392	147,663	161,750	1,280	163,030
Leeds	*Mar. 31, 1915	Aug., 1897	,,	115	71	1,907,865	1,814,758	93,107	1,678,844	14,487	1,400,687	590,421	4,961	429,902	4,038	433,940
Leicester... ...	Dec. 31, 1914	May, 1904	,,	37	0	1,006,946	818,073	138,290	828,953	22,404	674,936	147,944	91,843	149,664	20,571	170,235
London	*Mar. 31, 1915	...	H.	9	67				...	...	...	...	...	10,261	540	10,801
		May, 1903	C.E	274	35	(c)	(c)	(c)	13,744,806	...	9,836,187	3,786,403	565,095	2,323,130	65,916	2,389,046
N'castle-on-Tyne	*Mar. 31, 1915	Dec., 1901	E.	62	72	1,597,129	1,309,200	287,929	1,332,133	21,178	905,066	524,407	74,656	280,147	13,117	293,264
Northampton ...	*Mar. 31, 1915	July, 1904	,,	12	37	239,800	147,255	92,545	173,019	13,883	118,932	48,610	14,628	30,775	534	31,309
Portsmouth ...	*Mar. 31, 1915	Sep., 1901	,,	34	48	708,619	708,619	Nil	731,174	21,132	423,103	285,516	81,715	121,909	2,082	123,991
Preston	Mar. 31, 1914	June, 1904	,,	17	16	224,102	187,269	36,833	187,269	10,888	117,315	47,130	39,392	45,618	328	45,946
Reading	*Mar. 31, 1915	July, 1903	,,	13	14	235,000	234,000	1,000	237,102	17,996	155,419	75,406	19,471	35,608	1,074	36,682
Sheffield	*Mar. 25, 1915	Sep., 1899	,,	79	8	1,782,471	1,484,400	298,071	1,558,246	19,703	1,122,482	512,567	34,450	391,535	2,996	394,531
Wellington, N.Z.	Mar. 31, 1914	...	,,	31	55	496,423	496,423	...	628,151	19,821	496,423	46,836	120,191	157,096	1,161	158,257

C—Electric conduit system. E—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(a) Includes £1,441 trackless. (b) Includes leased lines. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed
(d) Not including 12 miles 40 chains leased lines. (e) Includes 7 miles 34 chains leased lines. (f) Unlimited. (h) Includes 9 miles 26 chains railless trolley routes.
(i) 17 mi. 8chn. single track leased. (l) Including Insurance. (p) Including leased lines. (q) Corporation working commenced June, 1906. (r) Including £5,744 Accident Reserve.

Digitized by Google

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit.	Deductions from Gross Profit.						Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal.	Sundries.	Total.	
Aberdeen	23,291	12,148	7,920	8,166	51,525	36,477	...	4,789	5,179	...	13,840	(i) 1,669	25,477	+ 11,000
Accrington... ...	7,570	2,792	2,268	4,880	17,510	12,683	...	3,969	3,783	198	3,100	65	11,115	+ 1,568
Ashton-und'r-Lyne	5,215	(i) 1,919	2,874	3,470	13,478	9,442	...	2,300	3,965	776	250	...	7,291	+ 2,151
Ayr	4,682	(i) 2,301	1,494	2,504	10,981	7,004	...	2,487	2,310	...	...	...	7,004	...
Birmingham ...	187,946	(i) 86,491	86,067	113,375	473,879	173,135	5,558	71,965	58,402	...	...	730	131,097	+ 47,596
Blackburn	16,859	6,197	14,451	9,421	46,928	21,374	287	(h) 4,388	15,450	251	1,572	...	21,661	...
Blackpool	17,632	(i) 7,755	9,239	10,225	44,851	31,254	...	(h) 9,878	7,640	...	...	...	17,518	+ 13,736
Bolton	30,044	(q) 9,486	15,912	20,689	76,131	65,279	857	(h) 10,525	17,520	1,713	18,339	(i) 981	49,078	+ 17,058
Bradford	91,597	(i) 36,890	64,670	52,938	246,095	83,793	4,525	22,087	24,164	5,422	7,832	4,203	63,708	+ 24,610
Brighton	14,152	(i) 6,759	13,690	8,384	42,985	13,541	55	7,661	5,917	...	...	...	13,578	+ 18
Burnley	21,142	(i) 10,079	9,141	17,955	58,317	20,150	...	6,796	8,284	1,515	...	(f) 1,890	18,486	+ 1,664
Burton-on-Trent ..	5,609	(i) 1,821	2,686	3,086	13,202	3,531	24	1,266	1,451	...	...	...	2,717	+ 838
Bury	16,129	4,971	7,162	7,504	35,766	33,250	303	(h) 7,037	6,026	825	2,472	(w) 11,193	27,553	+ 6,000
Chester	3,304	(i) 1,834	1,318	2,256	8,712	4,540	130	(h) 2,748	1,018	...	904	...	4,670	...
Chesterfield ...	3,214	1,368	2,936	2,192	9,710	4,363	269	2,275	1,900	...	...	...	4,175	+ 457
Colchester	3,045	1,372	2,370	2,783	9,570	4,223	28	(h) 1,986	2,496	...	...	(i) 172	4,654	− 403
Croydon	31,319	(i) 9,151	14,128	17,684	72,282	16,332	749	7,889	7,415	1,587	...	...	16,891	+ 190
Darlington... ...	4,273	896	1,895	2,103	9,167	4,545	160	1,926	2,006	101	1,202	...	5,235	− 530
Darwen	4,064	1,146	3,260	2,653	11,123	4,510	222	2,221	2,190	...	1,050	...	5,461	− 729
Derby	18,514	(i) 3,502	6,926	8,941	37,883	14,998	199	6,152	3,568	§ 12	5,432	(l) 141	15,305	− 108
Doncaster	4,969	1,342	6,550	4,166	17,027	6,181	16	2,935	1,840	138	572	58	5,543	+ 654
Dundee	17,829	(i) 7,398	7,445	10,686	43,358	24,916	...	8,990	6,700	323	7,842	...	23,855	+ 1,061
East Ham	19,381	6,796	14,558	10,884	51,619	8,613	...	5,279	6,858	...	...	...	12,137	− 3,524
Exeter	4,793	1,535	1,715	3,556	11,599	6,420	...	(h) 2,241	1,950	120	...	...	4,311	+ 2,109
Gloucester	7,250	1,643	2,975	1,836	13,704	4,103	...	(h) 5,362	1,881	370	...	...	7,613	− 3,510
Halifax	30,501	7,877	13,529	21,597	73,504	39,321	345	10,424	12,106	...	(y) 925	(i) 2,632	23,455	+ 16,211
Ilford	10,444	3,518	4,171	5,387	23,520	8,461	557	3,786	5,252	...	...	...	9,038	− 20
Ilkeston	2,262	789	1,378	1,460	5,889	1,197	160	1,450	1,532	90	...	96	3,168	− 1,811
Ipswich	8,801	1,962	5,033	3,494	19,290	3,999	(u) 4,877	(h) 3,660	2,207	...	3,421	(i) 237	9,525	− 649
Keighley	3,129	729	1,210	1,676	6,744	2,509	190	935	1,876	...	...	...	2,811	− 112
Kilmarnock ..	2,995	(i) 801	1,434	1,636	6,866	1,751	5	(h) 1,863	1,110	...	1,160	...	4,133	− 2,377
Kirkcaldy	4,811	1,416	2,312	2,912	11,451	5,525	68	2,604	2,411	...	409	136	5,560	+ 33
Lancaster	2,207	(i) 617	879	1,615	5,318	375	52	942	1,250	...	...	...	2,192	− 1,765
Leith	9,979	3,455	5,148	4,215	22,797	14,587	2,264	(h) 6,029	7,850	...	3,252	150	17,281	− 430
Leyton	p) 22,360	8,611	13,711	12,923	57,605	13,084	133	10,007	8,461	...	...	202	18,670	− 5,453
Lincoln	1,446	656	967	872	3,941	2,611	47	1,529	1,071	...	...	(i) 6	2,606	+ 52
Liverpool	192,352	69,830	83,100	123,527	468,809	228,267	25,231	50,082	63,726	...	(d) 34,821	(e) 4,869	153,498	+ 100,000
Lowestoft	3,405	655	1,552	2,323	7,935	3,795	..	2,441	2,251	...	...	...	4,692	− 897
Maidstone	2,584	1,152	2,052	1,771	7,559	3,445	56	2,473	1,976	...	...	...	4,449	− 948
Manchester ..	273,002	(i) 117,573	85,280	128,350	604,205	297,670	14,615	(h) 58,243	57,599	13,790	48,584	(e) 34,069	212,285	+ 100,000
Nelson	2,390	798	1,717	1,982	6,887	2,465	...	958	1,059	...	...	314	2,331	+ 134
Newport (Mon.) ..	10,429	4,234	9,655	6,638	30,956	11,748	857	5,694	4,357	...	1,886	(i) 668	12,605	...
Nottingham ..	48,272	14,674	17,408	30,692	111,046	68,269	...	16,444	21,121	...	...	(i) 2,040	39,605	+ 28,664
Oldham	27,159	10,158	28,025	19,742	85,084	28,730	1,639	16,158	11,734	2,347	...	(g) 5,799	36,038	− 5,669
Perth...	...	...	...	...	6,002	3,870	...	...	...	...	...	...	...	...
Plymouth	8,430	3,896	4,514	8,026	24,866	16,014	1,257	4,282	3,141	690	5,121	...	13,234	+ 4,037
Pontypridd ..	5,194	1,363	6,831	3,291	16,670	6,575	...	3,761	3,791	...	‖ 665	252	8,469	− 1,859
Rawtenstall ...	6,126	2,446	3,187	4,273	16,032	9,504	85	5,483	6,493	...	...	...	11,976	− 2,387
Rochdale	19,308	5,063	10,984	11,537	46,892	36,510	1,636	11,478	9,594	2,038	...	(i) (z) 10,752	33,862	+ 4,284
Rotherham... ...	E 11,039	4,071	5,864	8,718	29,692	14,201	195	5,349	3,465	...	4,082	...	12,896	+ 1,500
	RT ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salford	75,579	(i) 24,562	27,778	48,819	176,748	81,229	4,477	15,791	668	4,112	492	(k) 29,378	51,441	+ 34,265
Southampton ..	21,466	(i) 6,862	9,433	12,545	50,306	20,732	(t) 6,757	7,564	7,557	952	5,000	...	21,073	+ 6,416
Southend-on-Sea	8,046	2,260	3,534	6,187	20,027	14,891	4,228	(h) 3,834	1,753	...	4,017	...	9,605	+ 9,514
Southport	4,922	(i) 2,406	2,765	3,015	13,108	7,312	6,249	6,549	5,018	...	2,120	...	13,687	− 126
South Shields ...	9,249	(i) 5,225	4,156	6,880	25,510	14,335	140	5,230	3,651	...	...	...	8,881	+ 5,594
Staly'dge, H., M., D.	12,818	(i) 5,022	7,448	5,761	32,049	5,571	...	7,485	7,786	...	400	397	16,068	− 10,497
Stockport	15,630	5,817	10,718	4,683	36,848	29,886	2,260	5,240	10,008	1,586	3,134	2,790	22,758	+ 9,837
Sunderland ...	19,807	5,608	4,867	11,267	41,549	34,066	265	(h) 6,464	10,374	1,218	10,875	400	29,331	+ 5,000
Swindon	2,854	828	1,534	1,850	7,066	1,845	45	1,215	1,422	...	...	...	2,637	− 747
Wallasey	18,736	(i) 6,704	6,213	10,801	42,454	22,051	1,249	5,520	5,072	...	...	634	11,226	+ 12,074
Walsall	8,510	3,326	4,315	5,670	21,821	12,268	1,339	4,962	3,975	551	640	...	10,128	+ 3,479
Walthamstow ...	14,417	2,972	8,845	8,546	34,780	7,009	30	(h) 6,427	3,468	...	...	(i) 712	10,607	− 3,568
Warrington ...	6,135	(i) 2,556	2,996	3,323	15,010	7,882	481	2,418	3,447	...	...	...	5,865	+ 2,498
West Ham	52,659	† 14,531	33,326	19,420	119,936	32,276	243	18,875	12,679	...	692	...	32,246	+ 273
West Hartlepool	4,791	1,586	2,956	2,241	11,574	7,931	3	2,569	1,847	...	..	(f) 500	4,916	+ 3,018
Wigan	17,340	5,252	12,768	10,817	46,177	31,200	331	(h) 13,866	13,101	...	...	3,662	30,629	+ 902
Wolverhampton ...	13,031	(i) 6,239	8,594	7,202	35,066	20,257	(x) 2,535	7,760	5,669	203	5,416	...	19,048	+ 3,744
Yarmouth (Gt.) ...	7,397	(i) 1,989	2,833	4,441	16,660	5,706	40	(h) 4,158	2,883	...	...	...	7,041	− 1,295
York	9,958	(i) 2,908	2,785	6,004	21,655	8,472	...	(h) 5,176	2,084	...	...	...	7,260	+ 1,212

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	75,752	17,245	35,294	28,622	156,913	113,325	...	48,342	31,277	1,478	17,879	2,164	101,140	+ 12,185
Bexley	3,282	1,382	*3,554	828	(s) 11,630	4,716	...	2,794	2,509	...	324	...	5,627	− 911
Birkenhead ...	15,923	(i) 5,621	12,124	5,839	39,507	26,278	...	(h) 11,340	9,760	527	3,500	151	25,278	+ 1,000
Bournemouth ..	22,933	7,998	9,095	15,040	55,066	47,280	955	(h) 10,587	16,535	...	...	(i) 12,166	39,288	+ 8,947
Cardiff	43,914	11,332	26,879	26,593	108,718	67,323	1,123	23,925	22,645	2,272	6,947	2,655	58,444	+ 10,002
Coventry	13,626	4,333	9,005	3,564	30,528	14,876	137	8,521	5,755	...	...	(i) 634	14,910	+ 103
Glasgow	345,625	(i) 193,837	144,530	51,995	735,987	340,891	65,826	78,797	105,492	22,790	172,310	14,377	393,766	+ 12,951
Huddersfield ...	33,571	(i) 7,911	20,449	12,047	73,978	53,081	...	(h) 12,536	13,061	2,274	15,575	1,235	44,681	+ 8,400
Hull	(i) 58,137	12,634	31,909	11,622	114,302	48,728	...	16,578	13,883	576	3,117	...	34,154	+ 14,574
Leeds	115,601	40,347	43,609	28,577	228,134	205,805	7,837	47,174	57,773	7,356	11,928	(i) 7,844	132,075	+ 81,567
Leicester	59,052	11,397	22,836	25,322	118,607	51,628	1,660	24,218	13,764	2,801	10,741	1,284	52,808	+ 480
London	H. 4,737	1,859	3,878	(m) 5,854	16,328	def. 5,527	...	330,301	405,605	32,102	1,541	(l) 15,851	785,400	− 33,172
	E. 793,481	(r) 276,574	364,064	250,124	1,684,243	704,803	47,425							
N'castle-on-Tyne...	79,328	25,580	31,120	24,430	160,458	132,806	3,197	(h) 29,574	43,356	5,411	68	(i) 13,837	92,246	+ 43,757
Northampton ...	8,428	3,187	3,103	6,136	20,854	10,455	473	(h) 3,900	4,624	441	90	(ib) 1,221	10,276	+ 652
Portsmouth ...	31,414	(i) 13,293	8,371	5,580	58,658	65,333	(a) 11,483	21,643	18,455	1,941	11,677	532	54,248	+ 22,568
Preston	12,350	4,989	9,252	2,995	29,586	16,360	...	3,625	5,038	...	...	1,356	10,019	+ 6,341
Reading	8,324	(i) 4,356	4,313	3,643	20,654	16,028	11	6,709	5,062	263	...	...	12,034	+ 4,005
Sheffield	120,296	(i) 31,784	45,385	49,365	246,830	147,701	2,056	31,747	42,504	5,567	30,017	8,014	117,849	+ 31,908
Wellington, N.Z....	57,973	7,775	21,918	17,947	105,613	52,644	2,091	19,865	4,757	...	14,682	...	39,304	+ 15,431

(a) Includes £10,703 balance forward from previous year. (b) Includes £152 loss on omnibus account less profit on parcel service. (c) Includes £1,611 insurance fund. (d) Includes reserve. (e) Includes rents for leased lines. (f) Rent of leased lines. (g) Rent of lines and deficit on motor omnibus account. (h) Including income tax. (i) Includes Army Service Allowance. (j) Includes £692 deficit on railless traction. (k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account. (o) Includes £1,337 through-running contributions. (p) Includes £407 horse account. (q) Includes National Insurance. (r) Including special charges. (s) Includes £2,584 through-running contributions to L.C.C. (t) Includes balance forward from previous year. (u) From borough fund. (w) Amount apportioned to leased lines. (x) Includes £1,554 profit on motor char-a-banc. (y) Parliamentary Expenses. (z) Includes £6,519 rent of leased lines. * Includes £1,913 spent on renewals. † Under a resolution of the Council, the allowances to employees serving with the Forces, amounting to £6,031, are defrayed out of rates and therefore not included in these accounts. ‡ £2,950 profit from 3 months' working. § Composition for Stamp Duty. ‖ Mortgage Loans.

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Percentage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excludi'g Power Cost).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribution to Rates or Municip'l Funds.	Average Total per Car Mile. d.	Average Traffic per Car Mile. d.	Traffic. d.	General. d.	Repairs and Maintenance. d.	Power. (Price paid) d.	Total. d.	%	d.	Units.	Cost per Unit. d.	Units used per car mile.
Aberdeen ...	...	7,590	3,410	11·06	10·89	2·93	1·53	·99	1·03	6·48	58·54	5·45	2,317,204	·845	1·027
Accrington ...	...	...	1,568	12·64	12·49	3·17	1·18	·94	2·04	7·33	57·99	5·29	949,054	1·23	1·65
Ashton-u-Lyne	41	...	2,110	11·529	11·356	2·623	(e) ·965	1·446	1·745	6·779	58·80	5·034	659,302	1·125	1·382
Ayr...	...	...	...	9·61	9·18	2·50	1·25	·79	1·33	5·87	63	4·47	442,969	1·28	·98
Birmingham ...	30,000	17,596	...	10·910	10·793	3·169	1·459	1·451	1·912	7·991	73	6.079	24,185,574	1·125	1·7
Blackburn ...	...	...	...	13·81	13·71	3·40	1·25	2·92	1·91	9·48	68·70	7·57	1,739,274	1·3	1·84
Blackpool ...	...	1,736	12,000	16·82	16·65	3·90	1·71	2·04	2·26	9·91	58·93	7·65	1,552,635	1·58	1·43
Bolton	58	...	17,000	11·758	11·656	2·498	·788	1·323	1·721	6·330	53·836	4·610	4,514,010	1·1	1·56
Bradford	...	14,610	10,000	12·425	11·816	3·457	1·041	2·450	2·027	8·975	74·60	6·948	12,272,121	1	1·926
Brighton	18	...	...	12·240	11·782	3·064	1·464	2·964	1·816	9·308	72·79	7·10	1,676,770	1·2	1·51
Burnley	...	...	1,664	11·450	11·259	3·085	1·108	1·334	2·620	8·147	71·16	5·53	3,621,567	1·15	2·20
Burton-on-Trent	838	...	...	9·13	8·30	3·06	·99	1·47	1·68	7·20	78·5	5·28	530,080	1·39	1·04
Bury	...	(k)1,000	5,000	10·26	10·22	2·399	·776	1·253	1·268	5·696	51·82	4·428	2,045,692	1·25	1·26
Chester	...	...	...	9·16	8·94	2·28	1·27	·92	1·56	6·03	66	4·39	414,118	1·33	1·19
Chesterfield ...	...	457	...	11·1	10·8	2·54	1·08	2·31	1·73	7·66	68·9	5·93	420,824	1·25	1·38
Colchester ...	...	...	...	9·942	9·668	2·194	·989	1·709	2·006	6·898	69·24	4·892	445,214	1·5	1·34
Croydon	...	190	...	7·593	7·526	2·683	·784	1·211	1·516	6·194	78·68	4·493	3,000,308	1·416	1·071
Darlington ...	...	...	...	8·487	8·326	2·645	·554	1·172	1·304	5·675	66·85	4·371	504,546	1	1·301
Darwen	...	...	...	14·02	13·13	3·65	1·03	2·93	2·38	9·99	71·15	7·61	485,033	1·312	1·812
Derby	...	...	...	10·233	10·426	3·650	·691	1·365	1·763	7·469	71·6	5·706	1,479,947	1·45	1·216
Doncaster ...	...	654	...	10·52	10·37	2·24	·61	2·97	1·90	7·72	73·1	5·82	799,965	1·25	1·51
Dundee	...	61	1,000	11·802	11·465	3·082	1·278	1·288	1·847	7·495	63·5	5·648	2,564,659	1	1·547
East Ham ...	..	...	...	9·05	8·95	2·91	1·02	2·19	1·63	7·75	85·70	6·12	2,461,677	1·062	1·54
Exeter	...	2,109	...	9·629	9·60	2·560	·821	·917	1·900	6·198	64·37	4·298	615,956	1·375	1·38
Gloucester ...	...	...	...	6·84	6·41	2·78	·63	1·14	·71	5·26	77	4·55	470,336	1	·70
Halifax	...	(r) 7,483	(s)6,171	11·657	11·514	3·141	·812	1·393	2·225	7·571	65	5·35	4,607,293	1·125	1·98
Ilford	...	...	...	8·127	8·006	2·846	·729	1·164	1·109	5·848	73·6	4·60	1,131,616	1·125	1·172
Ilkeston	...	...	...	7·04	6·87	2·3	·8	1·3	1·4	5·8	83	4·4	372,200	1	1·54
Ipswich	...	...	...	8·705	8·52	3·290	·732	1·882	1·306	7·210	82·83	5·904	670,809	1·25	1·045
Keighley	...	...	...	8 962	8·675	3·031	·706	1·172	1·623	6·532	72·88	4·909	277,320	1·45	1·12
Kilmarnock ...	...	...	...	7·413	7·240	2·569	·695	1·235	1·408	5·907	79·6	4·499	314,191	1·25	1·13
Kirkcaldy ...	33	...	...	9·085	8·864	2·574	·758	1·238	1·558	6·128	67·4	4·57	698,804	1	1·558
Lancaster ...	...	...	...	8·10	7·80	3·11	·87	1·242	2·28	7·50	92·57	5·22	227,984	1·7	1·34
Leith	...	...	...	9·26	8·99	2·47	·86	1·27	1·03	5·63	60·98	4·60	984,428	1·027	1·02
Leyton	...	...	...	9·355	9·151	(c) 2·959	1·140	1·815	1·710	7·624	81·338	5·914	3,043,900	1·019	1·678
Lincoln	52	...	...	10·59	10·40	2·34	1·06	1·56	1·41	6·37	60·2	4·96	173,895	1·25	1·128
Liverpool ...	...	...	100,000	12·25	12·02	3·380	1·227	1·460	2·171	8·238	65·6	6·067	26,007,694	1·14	1·9
Lowestoft ...	...	...	...	9·1	8·8	2·60	·5	1·2	1·8	6·1	67·64	4·3	318,601	1·75	1·03
Maidstone ...	...	...	...	8·77	8·295	2·04	·90	1·63	1·40	5·97	71·96	4·57	366,191	1·125	1·217
Manchester ...	...	...	100,000	11·300	11·123	3·420	1·473	1·069	1·608	7·570	63·47	5·962	29,922,197	1·039	1·562
Nelson	134	...	...	11·66	11·60	2·98	·99	2·14	2·48	8·59	74	6·11	241,886	2	1·26
Newport (Mon.)...	...	...	...	10·622	10·385	2·594	1·053	2·402	1·651	7·700	72·49	6·049	1,178,500	1·30	1·22
Nottingham ...	...	6,164	22,500	11·35	11·16	3·06	·93	1·10	1·94	7·03	62·78	5·09	5,806,688	1·25	1·53
Oldham	...	...	...	13·351	13·101	3·186	1·191	3·288	2·316	9·981	74·75	7·665	3,158,752	1·5	1·544
Perth	...	...	...	9·39	8·51	3·08	·40	·77	1·46	5·71	60·79	4·25	295,846	1·25	1·17
Plymouth ...	...	...	4,037	12·066	11·450	2·42	1·11	1·29	2·298	7·12	60·83	4·82	1,159,069	1·66	1·38
Pontypridd ...	...	...	...	13·07	12·84	2·92	·76	3·84	1·85	9·37	71·7	7·52	631,981	1·25	1·48
Rawtenstall ...	...	...	...	10·11	9·699	2·40	·99	1·27	1·69	6·35	62·57	4·66	833,714	1·23	1·37
Rochdale	4,284	...	...	11·292	11·134	2·611	·682	1·524	1·654	6·471	56·2	4·817	2,836,062	1·006	1·694
Rotherham ...	E. ...	...	1,500	12·37	12·37	3·11	1·15	1·65	2·46	8·37	67·65	5·91	1,669,691	1·25	1·96
	R.T....	...	...	...	...	...	...	..	...	...	...	...	...	...	...
Salford	...	12,265	22,000	10·623	10·622	3·112	1·011	1·144	2·050	7·317	66	4·972	9,602,534	1·22	1·667
Southampton ...	1,282	...	5,134	...	...	...	...	...	...	...	...	.....	...	...	...
Southend-on-Sea	2,514	1,000	6,000	13·14	12·97	3·03	·85	1·33	2·33	7·54	57·35	5·21	848,538	1·75	1·33
Southport ...	...	...	...	10·303	10·227	2·483	1·213	1·395	1·521	6·612	63	4·958	465,241	1·5	·977
South Shields ...	...	3,194	2,400	10·308	10·160	2·392	1·352	1·075	1·780	6·599	62·4	4·652	1,200,086	1·353	1·293
Stalybridge, &c.	...	...	...	8·084	8·056	2·755	1·079	1·600	1·453	6·887	83·15	5·269	1,803,063	·9	1·614
Stockport ..	...	250	9,137	10·389	10·322	2·413	·923	1·604	·731	5·671	55	4·940	2,078,189	·512	1·348
Sunderland ...	...	...	5,000	12·210	12·148	3·198	·905	·786	1·820	6·709	54·75	4·8	1,802,694	1·5	1·21
Swindon	...	...	...	9·62	9·24	3·06	·89	1·65	1·99	7·59	79·29	5·60	277,568	1·6	1·24
Wallasey ...	...	4,500	(a) 8,000	12·048	11·896	3·499	1·252	1·160	2·018	7·929	65·8	5·911	1,851,649	1·4	1·44
Walsall	2,479	...	1,000	11·353	11·094	2·834	1·108	1·437	1·888	7·267	64·012	5·379	838 649	1·68	1·164
Walthamstow ...	...	...	...	8·75	8·66	3·02	·62	1·85	1·79	7·28	83·23	5·49	1,491,700	1·375	1·3
Warrington ...	2,498	...	...	12·334	12·193	3·305	1·377	1·615	1·790	8·087	64·22	6·208	531,700	1·5	1·193
West Ham ...	...	273	...	9·713	9·427	3·359	1·314	2·127	1·239	8·039	78	6·41	6,306,731	·75	1·66
West Hartlepool	...	3,018	...	9·77	9·52	2·39	·79	1·49	1·13	5·80	59	4·67	680,972	·78	1·42
Wigan	902	...	...	12·415	12·077	2·791	·866	2·052	1·736	7·445	59·70	5·80	2,186,073	1·187	1·461
Wolverhampton	...	...	3,744	11·239	11·091	2·648	1·267	1·746	1·463	7·124	62·5	5·661	1,712,796	1	1·45
Yarmouth (Gt.)...	...	...	...	7·927	7·752	2·618	·704	1·008	1·575	5·905	76·17	4·30	708,756	1·50	1·046
York	...	1,212	...	9·45	9.31	3·11	·92	·88	1·89	6·80	71·87	4·91	...	...	...

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

									*					Works Cost.	
Belfast	...	...	12,185	10·08	9·93	2·83	·64	1·32	1·07	5·86	58·07	4·79	10,439,797	·658	1·39
Bexley	...	..	...	11·13	12·3	2·53	·85	2·82	·68	6·88	71·1	6·20	487,110	·827	1·66
Birkenhead ...	...	1,000	...	13·058	12·922	3·161	1·115	2·406	1·160	7·842	59·99	6·67	2,341,009	·60	1·936
Bournemouth ...	...	8,947	...	13·52	13·46	3·03	1·05	1·20	(b) 1·99	7·27	53·80	5·28	3,072,169	·65	1·69
Cardiff	10,002	...	...	12·354	12·14	3·843	·992	1·358	·835	7·028	59·1	6·193	4,936,582	·475	1·80
Coventry ...	103	...	...	9·902	9·734	2·971	·945	1·964	·778	6·658	67·2	5·88	1,651,950	·502	1·47
Glasgow	...	...	12,951	10·674	10·612	3·426	1·922	1·432	·515	7·295	59·87	6·266	33,848,947	·366	1·40
Huddersfield ...	8,400	...	...	11·05	10·79	2·92	·70	1·78	1·04	6·44	58·22	5·40	5,398,258	·49	1·93
Hull	...	4,574	10,000	8·61	8·53	2·87	·66	1·68	·61	5·82	67·58	5·26	6,352,263	·44	1·40
Leeds	...	...	81,567	10·936	10·834	2·914	1·016	1·099	·720	5·749	52·57	5·029	18,862,847	·668	1·918
Leicester	...	...	480	9·875	8·682	3·425	·661	1·325	1·469	6·880	69	5·411	7,540,856	·420	1·82
London	...	...	...	E. 9·77	9·50	3·24	1·14	1·49	1·02	6·89	68·73	5·69	152,666,477	·615	2·60
				H. 9·51	9·03	4·17	1·64	3·41	5·15	14·37	151·17	14·37	...	...	...
N'castle-on-Tyne	...	25,757	18,000	12·187	11·642	3·297	1·063	1·293	1·015	6·668	53·02	5·653	11,259,266	·382	1·968
Northampton ...	...	652	...	10·89	10·70	2·94	1·10	1·08	2·13	7·25	68	5·12	1,189,423	1·24	1·57
Portsmouth ...	6,568	(i) 6,000	10,000	12·201	11·997	3·092	1·308	·824	·549	5·773	48·88	5·050	3,272,089	·483	1·139
Preston	...	5,041	1,300	10·75	10·54	2·890	1·168	2·164	·700	6·922	64·40	6·222	1,765,250	·407	1·49
Reading	...	1,005	3,000	9·520	9·242	2·165	1·131	1·119	·945	5·360	54·55	4·248	1,180,507	·740	1·15
Sheffield	...	9,032	22,876	10·747	10·666	3·277	·866	1·236	1·345	6·724	61·116	5·379	18,329,775	·646	1·979
Wellington, N.Z.	15,431	...	...	16·309	16·189	5·974	·801	2·259	1·850	10·884	65·86	9·034	4,769,149	·906	2·05

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (a)—Debit balance forward £426.
(b) Including current supplied by Bournemouth and Poole Supply Company. (c) Horse account ·054d. (e) 161 Army Service allowance. (f) Insurance fund.

Digitized by Google

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Car Mileage.	Passengers Carried.	Passengers Carried per Car Mile.	Average Fare per Passenger. d.	Average Journeys per Head of Populat'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track. £	Average Traffic Revenue per Annum per Head of Populat'n Served.	Operating Expenses per Passenger. d.	Average Distance of 1d. Fare. Miles.	Average Fare Charged per Mile. d.	Average Speed per Hour. Miles.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
	Traffic Records.															
Aberdeen ...	165,000	1,909,009	24,048,816	12·59	·86	145·8	90	3,121	10/6	·514	1·861	·57	7·6	812	63	83
Accrington...	45,525	573,536	4,998,979	8·72	1·377	109·8	105	3,033	13/1	·84	1·07	·929	7·5	250	18	27
Ashton-u-L.	50,000	477,155	4,886,149	10·240	·657	164·84	109	2,757	9/-	·392	1·223	·81	8	209	12	25
Ayr	33,000	447,725	4,019,771	8·96	1·02	122	103	1,832	10/5	·65	1·25	·75	8	158	12	22
Birmingham	870,000	14,232,902	149,443,199	10·5	1·03	171·8	86·63	5,384	14·9	·76	...	...	...	...	...	...
Blackburn ...	200,000	1,121,769	12,223,569	10·89	1·28	61·12	105	2,528	6/6	·902	1·25	·76	7·50	434	31	61
Blackpool ...	67,500	1,085,655	13,624,514	12·55	1·32	201·8	103	4,370	22/4	·79	...	...	8	...	29	84
Bolton ...	221,000	2,886,180	31,370,166	10·86	1·066	141·49	124·07	2,920	12/8	·582	1·553	·633	7·25	980	70	112
Bradford ...	370,000	6,194,057	70,077,271	11·31	1·059	189	113	2,807	16/6	·84	1·66	·530	7·3	2,402·5	155	252
Brighton ...	133,935	1,108,352	11,837,828	11	1·10	88·38	76·08	3,165	8/1½	·83	1·27	·787	6·41	512	32	53
Burnley ...	175,000	1,644,712	15,867,699	9·65	1·16	96	120	3,544	8/10	·88	1·25	·83	7	798	42	67
Burton ...	48,000	440,021	3,311,355	7·53	1·06	69	...	1,790	6/4	·95	1·505	·58	7·5	...	...	20
Bury ...	128,202	1,613,357	15,513,264	9	1·07	121·47	99·73	1,904	10/9	·554	1·30	·77	8·54	...	...	54
Chester ...	39,028	347,318	3,275,944	9·43	·95	83·9	95	2,009	6/5	·64	1·27	·8	7	144·57	10·04	18
Chesterfield	50,000	304,376	2,950,774	9·7	1·1	76	122	2,668	5/5	·78	1·38	·75	7·33	126	7	17
Colchester ...	65,000	332,963	2,434,786	7·31	1·32	37·46	86·80	1,689	4/1	·94	·85	·96	6·77	147·14	10·51	18
Croydon ...	181,956	2,803,883	19,847,402	7·08	1·062	109·08	128	4,983	9/9	·850	2·15	·50	8·23	933·60	60	75
Darlington...	62,383	387,714	4,234,783	10·9	·76	62·15	96·5	1,499	4/4	·52	1·219	·45	6·66	151·25	11	18
Darwen ...	...	267,670	2,741,987	10·24	1·28	...	...	2,045	...	·97	...	...	...	...	...	...
Derby ...	124,000	E 1,217,304	12,414,263	10·20	1·003	100·1	...	2,359	8/4½	·73	1	·775	6·5	...	36	50
Doncaster ...	60,000	529,122	5,747,273	10·86	·955	95·79	93·9	1,798	7/7	·711	1·25	·76	7·5	239	18	32
Dundee ...	165,000	1,388,345	18,753,140	13·50	·851	113	...	2,345	8/-	·544	2	·50	7·3	...	...	72
East Ham ...	145,000	1,596,984	18,916,971	11·84	·75	130	...	4,192	8/2	·65	1·71	·63	...	...	...	...
Exeter ...	48,660	449,103	4,611,444	10·27	·93	95	...	2,566	7/4	·603	...	...	...	...	...	24
Gloucester ...	53,972	624,402	4,358,510	7	·92	81	90·60	1,113	6/2	·75	1·5	·65	7·08	250·8	19	30
Halifax ...	176,000	2,330,104	20,707,071	8·89	1·27	118	81·76	2,015	12/8	·852	1·553	·82	7·23	883·74	78	101
Ilford ...	88,000	945,433	9,203,077	10·48	·78	104·6	...	2,462	7/2	·613	1·543	·69	8	...	...	27
Ilkeston ...	32,000	241,548	1,746,382	7·2	·95	...	90	1,942	52/8	·8	1·50	·5	7	101	7	13
Ipswich ...	76,472	642,092	5,610,332	8·73	·975	73·4	64·4	1,532	6/-	·82	1·53	·693	5·47	322·56	20·16	36
Keighley ...	43,500	247,791	3,552,016	14·3	·68	...	55·2	..	4/1	·45	2·17	·459	...	18	7	12
Kilmarnock	36,000	278,987	2,311,708	8·28	·87	64·2	96·83	1,507	4/8	·712	1·13	·86	7·22	98·03	7·88	14
Kirkcaldy ...	39,600	448,469	5,492,120	12·24	·723	138	49	1,882	8/4	·5	1·522	·64	7	158	17	22
Lancaster ...	41,908	170,337	1,559,037	9·15	·852	37·20	75	1,153	2/8	·812	1·71	·5	8	84·7	6·05	12
Leith ...	110,500	968,808	10,220,069	10·55	·85	92·5	126	2,017	6/7	·53	1·32	·72	8·4	315	21	37
Leyton ...	124,735	1,813,462	17,472,882	9·64	·950	140	120	3,820	11/1	·791	1·77	·95	8·25	14·5	40·0375	60
Lincoln ...	20,000	148,440	1,713,542	11·5	·89	85·67	59·3	2,169	6/5	·552	1·75	·428	7	72	4	8
Liverpool ...	840,000	13,667,888	145,656,374	10·67	1·127	173·40	89·09	5,516	16/3	·772	2·514	·39	7·75	5,040	420	596
Lowestoft ...	35,000	307,838	2,706,348	8	1·07	77·32	70·25	2,787	6/6	·703	1·5	·7	5·75	192	12	19
Maidstone ..	25,000	300,945	2,423,514	8·053	1·03	96·94	82	1,478	8/4	·741	1	1	6·8	128	12	19
Manchester	957,500	19,158,051	202,768,420	10·6	1·06	212	93·5	4,835	18/7	·717	2·514	...	7·75	7·2	561	683
Nelson ...	45,000	192,378	2,484,775	12·92	·85	55·22	87·84	2,407	4/2	·665	1	1	5·5	108	6	11
Newport ...	90,000	964,895	9,410,109	9·75	1·09	104	...	2,909	9/3	·79	1·164	·898	...	...	...	44
Nottingham	264,000	3,789,857	41,210,964	10·87	1·02	156	95·28	3,984	13/4	·646	1·75	·442	6·92	...	109	155
Oldham ...	180,000	2,045,840	22,171,712	10·837	1·19	123·176	...	3,018	12/4	·92	1·13	·863	7	...	...	97
Perth... ...	35,900	252,216	1,844,588	7·31	1·16	51	...	1,289	5/-	·78	...	...	...	...	...	...
Plymouth ..	112,000	838,142	9 333,087	11·13	1·027	83·33	...	2,666	7/2	·639	...	...	...	...	...	42
Pontypridd ..	50,000	426,639	5,478,483	12·84	1	121	80·18	2,852	40/-	·73	1·5	·53	6·16	221	17	26
Rawtenstall	40,000	605,485	4,869,792	8·04	1·21	122	111	1,540	12/3	·79	1·121	·88	8·50	247·5	15	24
Rochdale ...	130,000	1,772,846	14,286,607	8·06	1·387	109·90	110·30	2,085	11/11	·78	1·07	·90	7·33	660	44	69
Rotherham...	64,000	E 850,548	9,828,838	11·55	1·07	153·6	...	3,645	13/1	·72	...	...	...	...	...	...
	...	RT ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salford ...	350,000	5,828,238	54,343,908	9·324	1·134	155	104	3,403	14/9	·78	2·20	·46	7·916	2,065·5	153	200
Southampt'n	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Southend ...	78,000	637,366	7,581,104	11·89	1·09	97·2	87	4,708	8/10	·634	1·41	·76	6·5	357	21	31
Southport ...	31,312	475,680	4,772,478	10·033	1·004	152·41	100	1,850	12/9	·7	1·6	·7	6·65	225	15	27
So'th Shields	110,600	927,728	10,479,421	11·296	·899	91	126	3,826	7/1	·58	3·1	·38	7·71	285	20	40
Stalybridge	94,091	1,116,936	8,406,915	7·706	1·06	89·3	...	1,353	8/-	·905	1·22	·72	6·8	...	...	60
Stockport	120,000	1,541,700	12,184,055	7·903	1·290	101·5	97·5	2,358	10/11	·726	1·333	·750	7·500	559	43	50 (c)
Sunderland	170,000	1,486,201	18,619,364	13·2	·97	109·5	78·3	3,696	8/10	·536	1·34	·68	7	688	43	70
Swindon ...	53,000	223,383	2,392,470	10·71	·859	45·14	75	1,955	3/4	·709	1·2	·85	6	...	...	12
Wallasey ...	87,000	1,284,938	13,555,876	10·54	1·15	153·51	99·2	3,190	14/8	·75	1·89	·54	7	388·53	35·5	67
Walsall ...	100,000	720,634	6,752,727	9·371	1·184	68	94	1,905	6/7	·775	1·24	·79	7	315	21	39
Walth'mst'w	130,000	1,146,743	13,499,838	11·77	·732	103	104	3,089	6/4	·618	1·18	·86	7·6	430	37	38
Warrington	86,000	445,459	6,012,212	13·474	·903	69·91	102·24	2,344	5/3	·59	1·246	·803	6·39	180·99	11·937	21
West Ham	296,570	3,760,361	42,667,561	11·35	·852	144	90	5,041	10/-	·67	1·85	·50	7·66	1,195·75	93	118
W. Hartlep'l	90,000	479,382	4,261,917	8·89	1·07	47	94	2,163	4/3	·65	1·262	·94	7	203	14	26
Wigan ...	200,000	1,495,786	13,811,709	9·23	1·344	69	97·57	2,427	7/6	·802	1·15	·88	7·4	567	42	73
Wolverh'ton	135,000	1,181,309	12,236,785	10·359	1·06	90·64	89	2,539	8/1	·687	1·25	·879	6·85	651·6	36·2	52
Yarmouth ...	56,000	677,153	4,236,424	6·25	1·239	75·65	80	1,500	7/10	·944	1·25	·76	7	310	23	35
York	82,600	762,540	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast ...	390,000	6,432,600	62,340,269	9·74	1·02	159	128	2,689	13/8	·60	1·96	·43	8·75	2,014	241	290
Bexley ...	16,500	316,970	2,270,070	7·16	1·55	133	126	2,922	19/10	1·24	1·59	·63	9·5	179	11	16
Birkenhead	137,996	1,209,117	14,822,697	12·25	1·052	107·41	73·46	2,702	9/3	·992	1·39	·66	6·84	483·81	45·09	65
Bournem'uth	120,000	1,815,632	16,967,210	9·34	1·44	141	...	3,103	16/11	·78	1·19	·87	6·8	...	...	91
Cardiff ...	182,729	2,742,846	30,424,407	11·09	1·09	166	85	4,358	15/2	·85	1·44	·736	7·5	1,408	88	130
Coventry ...	135,000	1,100,553	8,730,024	7·9	1·22	65	59	2,832	6/7	·84	1·18	·866	6·2	487	41	51
Glasgow	1,150,000	24,214,460	336,260,758	13·887	·764	292·4	105·61	5,404	18/7	·488	2·31	·44	8·11	8,974·78	628·20	856
Huddersfield	160,000	(a) 2,797,276	23,933,065	8·69	1·24	159	84	3,556	15/6	·73	1·34	·69	7·72	1,012·16	63·26	106
Hull ...	291,118	4,551,145	52,087,770	11·44	·745	178·92	123·43	4,879	11/1	·52	2·75	·364	9	1,565·60	97·85	180
Leeds ...	525,000	9,522,737	95,639,268	10·04	1·075	182	115·43	3,747	16/4	(b) ·884	1·93	·539	7·54	3,465	230	345
Leicester ...	232,644	4,137,262	37,914,773	9·146	·947	163	108·35	4,045	12/10	·751	2·18	·45	8	1,451	...	160
London ...	...	E 68,706,161	547,253,332	9·32	1·02	...	117·07	8,465	...	·73	...	...	8·95	17,972	1,374	1,730
		H 272,631	3,244,661	11·90	·76	...	77·12	1,045	...	1·21	...	...	5·85	131·80	10	37
Newcastle ...	300,000	5,775,323	65,085,452	11·27	1·073	217	...	4,454	18/8	·592	1·58	·633	...	...	...	223
Northampt'n	91,500	690,177	8,295,941	12·02	·89	90·66	...	2,470	6/8	·603	1·34	·7	...	...	...	33
Portsmouth	246,000	2,438,621	27,554,194	11·299	1·061	112·01	90·29	3,535	9/1	·495	1·66	·62	7	1,065	74	100
Preston ...	120,000	1,025,738	10,340,688	10·08	1·04	86·17	132	2,652	7/7	·764	1·01	·95	7·36	404·7	21·3	33
Reading ...	76,500	924,696	8,881,097	9·6	·96	116	114	2,704	9/4	·54	1·59	·68	7·5	336	25	36
Sheffield ...	485,228	8,810,252	107,023,195	12·147	·878	220	108·86	4,950	16/2	·553	2·917	·371	...	3,215·05	221·728	339
Wellington ...	70,000	2,328,849	24,565,376	11·28	1·43	359	85	4,708	44/10	1·031	1·125	·89	7·59	840	75	92

Digitized by Google

FINANCIAL REPORTS AND MEETINGS.

Liverpool Overhead Railway.—At the annual meeting on February 22, the chairman (Mr. H. C. Woodward) said there had been an increase in the passengers carried over the previous year of 16 per cent. first-class, 12 per cent. third-class, and 16 per cent. workmen, the total number being 15,082,502, creating a record. The receipts were £93,146, and after providing for interest on debenture stock the surplus was £24,041, while £7,013 was brought forward. A final dividend at the rate of 4 per cent. per annum was proposed on the ordinary stock, making 3¼ per cent. for the year, and carrying forward £6,873. The ordinary shares received 3 per cent. for each of the years 1914 and 1913, 2¼ per cent. for 1912, and 1½ per cent. for 1911.

Paisley District Tramways Company.—As the result of the trading for 1915, £6,500 has been placed to general reserve, £3,700 paid for half-yearly dividend on the 5 per cent. accumulative preference shares, and £1,000 placed to the preference share sinking fund for the first half-year. The directors now recommend that £3,750 be disbursed in cumulative preference dividend, £1,000 to preference share sinking fund, and £3,477 carried forward. Two years ago the ordinary shareholders received 1 per cent. The revenue for 1915 was £68,679, and the balance £19,477. Traffic showed an increase of £6,141, but expenses had largely increased due to the war bonus of 5s. per week, the cost of coal, and the increase in the price of all materials; £2,000 more than usual had been carried to general reserve to meet the cost of deferred repairs after the war.

Lancashire United Tramways.—The report for 1915 states that traffic receipts were £90,578, miscellaneous receipts, and electrical energy sold, £6,249. Less working expenses, £54,933; cost of generating electrical energy sold, £4,096; general charges (including direction, management, interest, etc.), £5,240; rent of leased lines, £5,191. Add dividend on holding in New St. Helens and District Tramways Company, Limited, £1,534; making profit of combined undertaking, £28,901. The interest and dividends received from the operating companies, together with sundry receipts, amounted to £14,017. After deducting interest on prior lien debenture stock and expenses, there remains £198, which has been carried to depreciation account. There is also a balance on the year's working of the operating companies, after payment of interest and dividends before-mentioned, of £16,203. The depreciation and renewal accounts and amounts carried forward in the combined companies now amount to £49,502.

Edinburgh Tramways Company.—Mr. B. Hall Blyth, who presided at the annual meeting on February 4, said it had been found that 5,000 of the 13,000 pulleys on the system were wanting or inefficient. Everything was being done by Mr. Cox, the new engineer, to overhaul the whole machinery before the end of March, and put the undertaking in as good a condition as ever it had been. A great many delays had taken place, and the late engineer accounted for them as being due to the new drivers, but, to a large extent, it was due to inefficient inspection and to lack of repairs. The company had been subjected to some abuse for increasing the fares, but with the large addition to the cost of working they were bound to consider the interests of the shareholders. He was in hopes of a satisfactory result to the negotiations for the Corporation to take over the undertaking. The report, which appeared in our issue of February 10, was adopted. Replying to a question, the chairman said that since the appointment of the women conductors, the collection of the fares had been better than before. The chairman also mentioned that although Mr. Shepherd's health had caused him to resign the post of general manager, the directors were glad to retain his services as secretary.

Tyneside Tramways and Tramroads Company.—Out of an available balance of £5,424 from the past year's trading, the directors recommended a dividend on the preference shares at the rate of 5 per cent. per annum, less income-tax (£601), and a dividend on the ordinary shares at the rate of 3 per cent. per annum, less income-tax (£2,008). They are placing £1,400 to reserve for renewals, depreciation, and other contingencies (which, with £496 interest on investments, will increase the fund to £22,562), and to the credit of special reserve account to meet contingencies, £500. To provide for loss on conversion of consols into War Loan, £288 19s. is allotted, leaving to be carried forward to next half-year, £525. The dividend on the ordinary shares for the whole year is at the same rate as for 1914. The traffic receipts decreased by £621 as compared with the corresponding half-year, and for the whole year there is a decrease of £1,043. At the annual meeting on February 8, Mr. T. Merz (chairman) said it was gratifying that the ordinary traffic had increased by 5 per cent., although the holiday traffic fell off by a matter of £1,400. The increased expenditure was largely due to repairs and upkeep of the line. The reserve fund had been increased by £3,399, of which £2,600 had been taken out of revenue, and £799 was interest on investments. They would have left for investment over £20,000. In 1914 they put £1,500 to a special fund in order to meet exceptional expenses, and they had added to it £500 this year. The meeting empowered the directors to spend a sum not exceeding £200 for the purposes of the war.

Sunderland District Tramways Company.—After providing for interest on the prior lien bonds and the first mortgage debentures, and for sinking fund instalment, and making provision for depreciation on investments, the net profit for 1916 was £1,759. To this must be added £644, brought forward, making £2,403, and the board recommended the payment of interest at the rate of 2½ per cent. per annum (less income-tax) on the first income bonds, which will absorb £1,752, leaving £651 to be carried forward. The traffic receipts showed a decrease of £522. Various economies in the working expenses had been effected, leaving an increase in the profit of £580. Mr. H. R. Hogg, presiding at the annual meeting, said that in the first three months of the war they lost £1,500 in receipts. For the past year the loss had only been £522. By a re-arrangement of what was not immediately necessary in their annual expenditure they had converted that loss into an excess of receipts of £580. The cars, buildings, overhead equipment, and permanent way had been kept up to the mark, but they had had to pay a considerably increased price for rails and tires, higher wages, and increased rates and taxes. The number of passengers was 4,515,568, as against 4,719,679. The car mileage was slightly reduced, and the ratio of costs to receipts came to 54·27 per cent., as against 56·84. The board would have liked to increase the number of cottages for the men's accommodation, but in view of the heavy cost of building they decided to postpone this during the war.

Liverpool Corporation Tramways.—In submitting the estimates for the year ending December 31 next, Councillor Russell Taylor (chairman of the Tramways Committee) said that for the past year it had been made possible to hand over to the rates £100,000 from the tramways profits, and £50,000 from the electric supply department, by the efficient working of Mr. Mallins, Mr. Dickinson, and the staffs under them. A vastly increased expenditure had been placed upon the tramways, but owing to the work that had been done, and the savings effected, the balance sheet showed in the net result only £11,000 below the prosperous year of 1914. They had carried free 4,984,469 soldiers, sailors, nurses, and doctors. The total number of passengers was 137,156,000, or 3,151,000 more. Owing to the forethought of the manager, the car mileage had been reduced by 995,274 miles. He appealed to the public to continue their consideration towards the tramways and their servants in case of an increase in the number of strap-hangers. If they reduced by 1-10th of a penny the penny fare paid by the 137 million passengers, it would lead to the wiping out of the profit handed over in relief of the rates, and possibly a loss. He warned the Council not to expect £50,000 next year in relief of the rates from the electricity department, as the coal bill was likely to be £22,000 more, in addition to which they would have higher wages and other extra expenditure. Alderman F. Smith said the changes introduced at Lambeth Road depot by Mr. Mallins enabled them to keep the cars in repair, and that had materially added to the result. The new electrical machinery, put in since Mr. Dickinson came, had reduced the cost of power.

Birmingham Corporation Tramways.—The accounts for 1914-15, recently issued in booklet form, show an increase in track to 118 miles 71 chains from 114 miles 44 chains. Traffic revenue increased by £12,075 and working expenses by £28,362. The gross balance fell by £16,829 to £173,135, and the net profit decreased by £28,375 to £47,596. Passengers increased by one and a half millions. These results are interesting in view of the higher fares that are being charged during the current year. Included in the capital account is an expenditure of £260,991 on street widenings, £39,439 of that sum being paid during the year under review. Appended is a two years' comparison of the chief items in the accounts:—

	1914–15	1913–14	Inc. or Dec.
Capital expenditure ...	£2,472,938	£2,334,437	+ £138,501
Loans outstanding ...	£1,940,158	£1,913,559	+ £27,599
Total track mileage ...	118 m. 71 chs.	114 m. 44 chs.	+ 4 m. 27 chs.
Traffic revenue ...	£640,091	£628,016	+ £12,075
Total revenue ...	£647,014	£635,471	+ £11,543
Working expenses ...	£473,879	£445,507	+ £28,372
Gross balance ...	£173,135	£189,964	– £16,829
Net profit	£47,596	£75,972	– £28,376
Passengers carried ...	149,443,199	146,930,986	+ 2,512,213
Average fare per passr.	1·03d.	1·03d.	—
Car mileage	14,232,902	14,268,244	– 35,342
Units per car mile ...	1·7	1·70	—
Power cost per car mile	1·912d.	1·913d.	– ·001d.
Receipts per single track mile ...	5·384d.	5·482d.	– ·098d.
Receipts per car mile	10·910d.	10·689d.	+ ·221d.
Expenses per car mile	7·991d.	7·494d.	+ ·497d.
Ratio of expenses to revenue	73%	70%	+ 3%

A reference to the motor omnibus accounts will be found on page 218

Digitized by Google

Blackpool and Fleetwood Tramroad Company.—The annual report for 1915 shows a net profit of £18,131, after providing for debenture interest, and £2,977 was brought forward. A final dividend of 4½ per cent. is proposed, making 6½ per cent. for the twelve months (as against a similar amount the previous year and 8½ per cent. in 1913), adding £615 to the depreciation reserve and £5,499 to the general reserve, writing £995 off investments, and carrying forward £4,250. Mr. J. Greenwood presided over the annual meeting on February 15. He first apologised for the absence through illness of Messrs. Boddington and Barningham, two of the directors, this being the first time that Mr. Boddington had missed a shareholders' meeting during his seventeen years of office. In moving the adoption of the report, the Chairman observed that the receipts were within a few pounds of the previous year's account, and but for the increase in rates and taxes the expenses would have been reduced by £2,521. The net result was a saving over the 1914 accounts of £1,482. The convenience to the public at times was not what they would have liked to have provided, but the cause was the shortage of labour. With the vigilance displayed by the staff the compensation and law expenses were practically nil. Negotiations were proceeding for the renewal of the lease of the tramways from Dickson Road to Bispham, where the Corporation had in hand the question of the protection of the cliffs. If a reasonable renewal of the lease of the tramways was arranged the directors, with the consent of the shareholders, would give a fair contribution towards the sea defence work, although the company had the right to transfer their tramroad on to the roadway. That would bring the cost of supporting the highway foundation on to the road authority. The company paid the Corporation £1,000 a year for 1½ miles of line leased from them, and they were open to negotiate for an extension of the lines at a higher rate. In all his experience he had not known a greater rent than the £676 per mile per annum that they now paid. Out of 92 men of eligible age when war was declared 72 per cent. had enlisted or attested, and 5 per cent. had been rejected. The manager was arranging to employ women as far as possible. Mr. R. H. Prestwich was re-elected a director. Votes of thanks were accorded to the directors, Mr. J. Cameron, the secretary and general manager, and his staff.

DIVIDEND ANNOUNCEMENTS.

MONTREAL TRAMWAYS.—A quarterly dividend of 2½ per cent.

SCOTTISH MOTOR TRACTION COMPANY.—A dividend of 7½ per cent. free of tax for the past year, £2,119 being carried forward.

GLASGOW SUBWAY RAILWAY.—A final dividend of 1 per cent. on the preference shares, making 2 per cent. for the year.

MERSEY RAILWAY COMPANY.—The net revenue for 1915 amounted to £21,442, compared with £21,279. It is proposed to pay interest of 1 per cent. on the B debenture stock.

CITY OF BUENOS AYRES TRAMWAYS.—A final dividend of 1s. 3d. per share, making 5 per cent. for the year, adding £4,200 to the amortization fund, and carrying forward £141.

BRITISH EMPIRE TRUST have received cable advice that a dividend of 2 per cent. has been declared on the capital stock of the Winnipeg Electric Railway Company for the quarter ended December 31, 1915.

TRACTION AND POWER SECURITIES COMPANY.—A dividend of 4s. 6d. per share, free of income-tax, on ordinary shares; a profit of £561 from sales of investments placed to reserve, and £8,579 carried forward.

CHATHAM AND DISTRICT LIGHT RAILWAYS.—A dividend of 5 per cent. for the year on preference capital and 6 per cent. on ordinary capital. The revenue shows an increase of £9,865; expenses have also heavily increased.

LONDON ELECTRIC RAILWAY.—Dividend on the ordinary shares for the six months ended December 31 of ¾ per cent., making 1¼ per cent. for the year, against ⅝ per cent. for 1914, carrying forward £12,303, against £11,547.

CITY AND SOUTH LONDON RAILWAY.—Dividend on the 5 per cent. preference stocks for the six months ended December 31 of 2½ per cent., making 5 per cent. for the year. Last year no final dividend was paid on the 1901 and 1903 stocks.

METROPOLITAN DISTRICT RAILWAY.—Dividend on the 5 per cent. second preference stock for the six months ended December 31 of 1½ per cent., making 3 per cent. for the year, against 2 per cent., carrying forward £13,952, against £13,888.

UNDERGROUND ELECTRIC RAILWAYS.—The revenue enables the company to pay full interest to December 31 on its 6 per cent. first cumulative income debenture stock and on its 6 per cent. income bonds and to carry forward about £38,500.

CENTRAL LONDON RAILWAY.—Dividends:—On the undivided ordinary stock for the six months of 1½ per cent., making for the year 3 per cent., against 2⅝ per cent., giving on the deferred 2 per cent. for the year, against 1¼ per cent., carrying forward £15,685, against £15,413.

PERSONAL.

Mr. H. R. Harper, Melbourne city electrical engineer, has had his salary increased from £1,000 to £1,250 per annum.

Mr. H. H. A. Curtis, of Lake Coleridge, New Zealand, has been appointed power station superintendent in the Tasmanian Government Hydro-electric Department.

Sir Charles A. Parsons, K.C.B., F.R.S., has been appointed a member of the Advisory Council by the Privy Council Committee, for Scientific and Industrial Research.

Mr. F. W. Bricknell, city engineer of Hull, and engineer to the tramways department, has been transferred from associate to full membership of the Institution of Civil Engineers.

Mr. G. Schofield, formerly constructional superintendent to West Ham Council, has been appointed chief assistant engineer to the Nairobi Power and Lighting Company, East Africa.

Mr. T. C. Winfield, works superintendent, West Ham Corporation, Tramways, on the recommendation of the Tramways Committee, has been granted an increase in salary from £250 to £275.

Councillor J. M'Caughey, J.P., has been appointed chairman of Belfast Corporation Tramways Committee in succession to Alderman J. Tyrrell, J.P. Councillor J. Warwick succeeds Councillor J. A. Duff as vice-chairman.

Mr. G. T. Milne, H.M. Trade Commissioner for Australia, will be paying an official visit to England about the middle of March. Manufacturers and others desirous of interviewing him should apply to the Director, Commercial Intelligence Branch, Board of Trade, London, E.C.

Major Fred Coutts, 5th Black Watch, general manager and electrical engineer of Paisley Tramways Company, was recently awarded the Territorial Decoration. This is given, the regulation states, as "a reward for long and meritorious service to officers of proved capacity." The qualifying period is twenty years, and not twelve years, as in the case of the efficiency medal for non-commissioned officers and men. Major Coutts's total service in the Volunteer and Territorial Forces extends to thirty years.

Mr. Andrew Nance is retiring from the management of the Belfast Corporation Tramways, and the Corporation have appointed him consulting engineer at a salary of £500 per annum. Mr. Nance was for many years general manager of the Belfast Street Tramways, which was one of the most successful tramway companies in the country. It made great progress under Mr. Nance's management, the annual receipts rising from £14,500 to £272,000, and good dividends were paid with unbroken regularity. When the Corporation purchased the undertaking in 1904 Mr. Nance was appointed general manager, and under his supervision the lines were electrified and extended. Considerable sums have been paid in relief of rates, a reserve fund of £200,000 has been accumulated, and payments to the sinking fund amount to £260,500. In July, 1914, Mr. Nance celebrated the jubilee of his tramway service. There are few tramway officers who can point to so long and so successful a career.

Mr. T. D. Courcy Meade, the city surveyor of Manchester, has died after a short illness. In the early part of his career Mr. Meade was engaged in railway construction in Ireland. In 1894 he received the Manchester appointment, in which he carried out many great works. In adopting upcast shafts for sewer ventilation, he utilised a large number of them as tramway standards.

Sir Charles Rivers Wilson, G.C.M.G., C.B., who died on February 9, after a distinguished career in Government service, became the first chairman of the British Electric Traction Company on its formation in 1895. He retired in 1911, but retained his seat on the board. He was also president of the Grand Trunk Railway of Canada, and had served on the Council of the Suez Canal and as chairman of the Rand Central Electric Works. Sir Charles was a vice-president of the Tramways and Light Railways Association, and was one of the subscribers to the memorandum of association. He was elected member of the Council and first president of the association in 1899, and when the association was reconstructed in 1906 he was elected a vice-president.

RAILWAY OFFICERS AND STAFF.

Lord Kenyon, a director of the Cambrian Railways, is in command of the Welsh Horse Reserve.

Mr. W. J. Shilton has been appointed general manager of the Buenos Ayres Midland Railway.

Colonel David Davies, M.P., chairman of the Cambrian Railways, is serving in France in command of the 14th Royal Welsh Fusiliers.

Mr. H. W. Thornton, general manager, Great Eastern Railway, has accepted the invitation of the President of the Board of Trade to become a member of the Railway Executive Committee.

Major S. G. Partridge, director of the Stationery Department at the General Headquarters in France, is a son of passenger guard A. G. Partridge, of Paddington, G.W.R. Before the war he was employed at the War Office, which he joined in 1900.

Lieut.-Colonel G. J. Baugh, R.E., who has been appointed deputy director of the inland water transport, prior to the war was the marine superintendent of the Lancashire and Yorkshire and London and North Western Railways joint steamship service at Fleetwood.

Digitized by Google

Lieutenant A. E. Haynes, R.F.A., who was mentioned in Sir Ian Hamilton's final despatch on the Gallipoli operations, before entering the Army was assistant divisional locomotive superintendent at Leeds Midland Railway. Lieut. Haynes has been awarded the Military Cross.

Sergeant P. H. Forbes, formerly of the G.W.R. chief accountant's office, Paddington, now serving with the Royal Engineers Railway Transport Establishment (Military Forwarding Section) at the General Headquarters, has been mentioned in despatches for meritorious services.

Mr. H. R. K. Woodward, G.W.R. divisional engineer at Shrewsbury, on leaving to take charge of the Bristol division, was the recipient of a presentation consisting of a tea-tray, kettle and lamp, also a silver tobacco-box and a pipe, subscribed for by all grades of the Engineering Department.

Mr. F. Tatlow, of the Railway Executive Committee, is a member of the committee appointed by the Board of Trade to consider all questions relating to the distribution of coal and coke that may be referred to them from time to time by the board or submitted by the District Coal and Coke Supplies Committees.

Mr. W. Finchett, accountant of the Cambrian Railways, was on February 22 entertained at dinner by the officers of the company in celebration of the completion of fifty years' service with the company. Lord Herbert Vane Tempest, a director, who presided, handed Mr. Finchett a cheque from the board of directors.

WITH THE FORCES.

Corporal T. Fearing, of Bury Council electricity works, has been awarded the D.C.M. for brave conduct at the front.

Mr. Eric Smith, electrical engineer to the Santa Fé Railway, has returned to England and joined the signal company of the Canadian contingent.

Corporal Hunt, of the Manchester solid tire staff of the Shrewsbury and Challiner Tire Company, has won the Distinguished Conduct Medal in France.

Lance-Corporal B. J. Kenyon, a Wigan Corporation car conductor, has been given a Distinguished Conduct Medal for gallantry at Ypres, in May of last year.

Mr. C. W. Salt, borough electrical engineer of Torquay, who recently enlisted in the London Territorial Electrical Engineer Corps has been promoted corporal.

Chief Inspector Clarke, Lowestoft Corporation Tramways, who is one of the 27 employees serving in the forces, has been in hospital in England recovering from wounds.

Regimental Sergt.-Major B. Tripp, S. Lancashire Regiment, has received the Distinguished Conduct Medal. He enlisted from the Manchester works of the British Westinghouse Company.

Privates Jolly and Eglington, two Doncaster tramcar conductors, have been awarded the Distinguished Conduct Medal. The Town Council have forwarded a resolution of congratulation to them.

Sergeant C. F. Claxton, 6th Divisional Ammunition Column, R.F.A., who has been awarded the Distinguished Conduct Medal for gallantry in action, was a conductor on the Liverpool Corporation Tramways.

Motorman C. S. Farmer and **Conductor C. H. Morgan,** of the Birmingham Corporation Tramways, have been awarded the Distinguished Conduct Medal for gallantry at the front. Morgan has since been killed in action.

Private J. O'Connor, of the Manchester Regiment, formerly employed in the Corporation Tramways department, has been awarded the D.C.M. for conspicuous bravery under heavy fire. The medal was affixed to his tunic by the Lord Mayor of Manchester.

Sergeant-Major D. Harrop, who, until the war, was electrical engineer in the testing room at the Hyde Road depot of Manchester Corporation Tramways, has been promoted second-lieutenant in the 12th Loyal North Lancashire Regiment, in recognition of zeal, devotion to duty, and bravery in the field.

Inspector Lee, Colchester Corporation Tramways, has been home on furlough from the Royal Army Medical Corps in France, after a year's service. As reported in our issue of December 9, he was awarded the French Military Medal for distinguished conduct. It was fastened to his tunic by General Haig, now the British Commander-in-Chief on the western front.

Captain H. Sparks, Suffolk Regiment, and **Lieutenant A. C. Sparks,** R.E., sons of Mr. Charles P. Sparks, President of the Institution of Electrical Engineers, have won distinction in the war. The captain was decorated with the Military Cross by the King at the investiture on January 15, and the lieutenant received the Ribbon of the Military Cross from his corps commander in France on February 5, for gallantry following the night attack on January 11-12.

Private R. E. Bullough, a son of Mr. R. C. Bullough, general manager, Colchester Corporation Tramways, has been promoted from the ranks and received a commission in the South Midland Division of the Royal Engineers. Lieutenant R. E. Bullough joined the ranks at the outbreak of war, and was attached to the King's Liverpool Regiment. Mr. Bullough has now two sons—both civil engineers—who have commissions in the Royal Engineers.

Sergeant H. Neale, of the Norfolk Regiment, who was employed on the Bradford Corporation Tramways, has been killed in action in France.

TRAMWAY AND LIGHT RAILWAY NOTES.

BIRMINGHAM.

COAL SHORTAGE AND TRAFFIC SUSPENSION.—INCREASE OF PASSENGERS.—LIGHTING RESTRICTIONS.—TRAMWAY HEROES.

On February 28, the second time this winter, the tramway service had to be suspended at the minimum traffic period owing to shortage of coal at the power-station. On this occasion the delivery of fuel has been impeded by the adverse weather conditions, but for some time the Electricity Committee have had great difficulty in purchasing a sufficient stock. The power was cut off from the cars for an hour during the afternoon. The number of passengers carried on the Corporation's tramcars and omnibuses shows a great weekly increase compared with last year. Up to February 26 the receipts for the year showed an addition of £127,309. As the fares were increased early in last year, the department should be well able to meet the extra expenditure entailed by the war. The tramways undertaking is reaping great benefit from their enterprise in developing what has now become the largest municipal motor omnibus business in this country. The receipts are now about £800 per week, an increase of over £150 as compared with last year. The new lighting restrictions were considered by the Tramways Committee on February 14, when Mr. Alfred Baker, general manager, reported that so far no difficulties had been encountered. It was felt that as long as the number of late passengers remained as large as now there would be no justification for any restriction. The Tramways Committee are considering the question of taking steps to perpetuate the memory of the men of the department who have fallen in battle.

GLASGOW.

TRAMWAYS AS A "MUNITIONS INDUSTRY."—RESTRICTED LIGHTING.—FEMALE DRIVERS AND CONDUCTORS.

The Tramways Committee have advised the Corporation to apply to the Ministry of Munitions to have the department declared a "munitions industry" under the recent amendment of the Munitions Act. In readiness for the operation of the restricted lighting order on February 25, the tramways department had painted the windows of the cars halfway down both on the upper and lower decks. Nearly 20,000 inside lamps had been dipped in a dark solution. This work was facilitated by the fact that the lighting is in three circuits, thus enabling one-third of the lamps to be removed at one time. The indicators and dash lights have also been dulled. The female conductors now number 1,180, and the experiment of women drivers is being continued with 25 young women. The Tramways Battalion are now in France.

LEEDS.

PROVIDING FOR INCREASED RUSH HOURS TRAFFIC.—EMPLOYEES' REQUESTS.—GROWTH OF THE UNDERTAKING.

In explaining to the City Council the arrangements made for the conduct of the tramway traffic in view of the increasing scarcity of car hands, Councillor R. A. Smithson, chairman of the Tramways Committee, stated that fewer cars would be run after 10 p.m. Since the earlier closing of various places of entertainment, there was a decreased traffic after 10 p.m. to the extent of about 30 per cent. On the other hand, the demand at early morning, midday, and at teatime was increasing, and the management had come to the conclusion it would be to the general benefit that cars should be diverted from late night duty and used to cope with the great demand earlier in the day. After interviewing a deputation of the tramways employees, the General Purposes Committee of the Corporation have decided not to recommend an increase of wages or any increase of the war bonus except in special cases. Mr. J. B. Hamilton, general business manager for the Corporation, lecturing on "The Romance of the Leeds Tramways" at the Philosophical Hall, observed that when he took up the appointment of general manager of the tramways some members of the committee informed him that the department had practically reached full growth. The revenue at that period was £221,253, whereas for the present year the anticipated receipts were £475,000. The sum of £1,678,000 had been expended on the undertaking, and its present value was £2,500,000, which might be looked upon as the profits accumulated during the twenty-two years of municipal ownership.

LONDON.

INCREASED USE OF TRAILERS.—DOUBLINGS AND WIDENINGS ON THE WOOLWICH ROUTE.

For nearly two years an extensive use of trailers has been made on the Embankment-Tooting route. On February 21 this means of facilitating traffic during the rush periods was introduced on the route running from the Embankment to the London-Croydon boundary. The orders for the construction of 150 trailers were placed prior to the war, but delivery has been impeded owing to the shortage of labour. Now that more of them are coming to hand, the advantage to the tramway service is very great. The women conductors are proving invaluable for taking charge of the trailers, although these vehicles have no top covers. Trailers will be introduced on the Tooley Street line to Greenwich and Woolwich as soon

Digitized by Google

as alterations have been made to a former horse car depot in order to house them. Arrangements have been concluded to permit of doubling of the tramways in several places at Woolwich before carrying out street widenings, owing to the demand of the Arsenal authorities for improved transport facilities for their workers. In a short time the tramways department will have overcome the difficulty caused by lack of sufficient power to work the largely increased number of cars on this route. The Whitehall authorities are not blameless for the inadequate service, for not long since they vetoed the proposal of the Highways Committee to provide a second route by linking up the Lee and Eltham tramways.

MANCHESTER.

MOTOR VEHICLES ON THE TRACKS.—TRAFFORD PARK TRAMWAYS.

In connection with the holding up of tramway services owing to the breakdown of motor wagons, Mr. J. M. McElroy, general manager of the Corporation Tramways, has stated that almost every day there is a block on the lines, and the department had to send breakdown gangs to clear the track. Mr. McElroy says that if drivers of motor lorries would keep to their proper side of the road the effect would not be so serious. He advocates that there should be a bye-law to regulate this rapidly-expanding traffic, so as to avoid these frequent dislocations. An inquiry was recently held by the Light Railways Commissioners into the application of Mr. Marshall Stevens and others interested in the development of the locality for sanction to construct three light railways in and adjoining Trafford Park. Opposition was offered by the railway companies, Manchester Ship Canal Company, Lancashire County Council, Manchester Corporation, and Stretford Council. The ground of objection was that the railways were not in the public interest; it was also alleged that the promoters intended to give preference to commercial undertakings in the Park over those outside.

NEWCASTLE-ON-TYNE.

THE ESTIMATES.—RENEWALS EXPENDITURE.—ANOTHER SUBURBAN EXTENSION.

For the ensuing year the Tramways Committee estimate the income at £319,000, as compared with £324,000 for the year shortly expiring. The estimate for the latter period was £282,200, the difference being due to the war activity. For the ensuing year the expenditure is put at £196,300, as against an estimate of £160,300 for the current year, but the total outlay will probably reach £196,175 The estimated surplus is £35,000. The expenditure in 1916-17 out of the reserve and renewals fund is estimated at £19,277. The similar outlay this year will probably reach a total of £24,368. Tramway communication to the populous suburb of Benton was opened on February 27, when Councillor R. Mayne (chairman of the Tramways Committee), Mr. W. Bramble (Sheriff), and other representatives of the city made the first journey, together with Mr. E. Hatton, the general manager, and other officials. From Benton the tramways department's motor omnibuses provide an extension to Burradon and Annitsford. The usefulness of the new services brought about in linking the west and the east was explained by the chairman. The terminus at Heaton Road has now been joined up by a short line to the tramways already laid and used, and there are thus four routes to Benton—*via* Jesmond Road, *via* Shieldfield, *via* Heaton Road, and *via* Chillingham Road. This addition gives the people who live near Armstrong Park the opportunity of reaching Newcastle by way of Jesmond instead of through Heaton. As re-arranged, there are now through services from Scotswood *via* Heaton to Benton, and from Westmorland Road *via* Jesmond; Heaton Road, and back by way of Raby Street, Byker to Westgate Road. This, in short, gives an idea of the way in which the new connection gives alternate routes, linking up widely-separated parts of the city. There was formerly no traffic from Stanhope Street in the west to the Central Station, as the cars ran to Blackett Street and on to Byker, but the manager has now arranged a service in which the cars will pass the Central Station.

PLYMOUTH.

LINKING-UP WITH DEVONPORT.—THE ARBITRATION.

Some months will elapse before the Plymouth Corporation Tramways are linked up with the tramways recently acquired from Devonport Tramways Company. Alderman S. H. Phillips, chairman of the Tramways Committee, in reporting on the result of the arbitration proceedings between the Corporation and the company, stated that a great deal of arduous work had been done in connection therewith by Alderman J. C. Tozer, Councillors J. C. Brown and J. Moon. The award was for £103,970, in addition to which they would have to pay half the costs of the arbitration, £1,446; the costs of the Corporation, £5,500; and the stamp duty for conveyance, £1,040. It was estimated that after paying interest and sinking fund on the total sum, and devoting a large sum to the improvement of the line, there would be a profit of £4,000 in the year beginning April 1. They proposed to give the western part of the borough a more regular and quicker service with less fares in many cases, and to spend a considerable amount on the permanent way and the cars. In the old Plymouth area the tramways had never cost the borough a penny, but had contributed thousands of pounds to the rates, in addition to paying off a large proportion of the cost.

CONTRACTS AND ORDERS.

Leyland Motors, Limited, Lancs., have received a contract for the supply of motor lorry bodies to the War Office.

Derby Council have placed an order with the British Electric Transformer Company for the supply of a transformer.

Walsall Council have accepted the tender of Belliss and Morcom, Limited, for the supply of a 3,750 KW. turbo-alternator, at £13,227.

Keighley Tramways Committee have purchased a second-hand petrol chassis for conversion into a tower wagon, at a cost of £180.

Barford and Perkins, Limited, Peterborough, have received an order for the supply of a motor road roller to the War Department.

The National Steam Car Company, Limited, London, have received an order from Manchester Gas Committee for a 3-ton coke-fired steam lorry chassis.

The Midland Railway Company has again accepted the tender of the General Electric Company for the supply of Osram drawn-wire lamps for the ensuing twelve months.

Glasgow and Electric Wagons.—Before submitting a proposal to use electric tipping wagons for refuse collection, the Cleansing Committee propose to visit Birmingham, Sheffield, and Dover in order to inspect electric vehicles in use in those places.

The General Electric Company, of China, Limited, Shanghai, have for the sixth time been successful in securing the yearly contract for the supply of Osram traction-type lamps to the Shanghai tramways. This contract was secured in face of competition from the suppliers of many other makes of lamps.

Johannesburg Council have allotted the following contracts:—Supply and erection, complete on foundations, of two Babcock and Wilcox marine type water-tube boilers, with auxiliary plant, Reunert and Lenz, Limited, £16,700; supply of cable, Telegraph Manufacturing Company, £2,130; supply of cable, Henley's (S.A.) Telegraph Works Company, £1,108.

Manchester Electricity Committee have placed the following contracts:—

B. Thomas, one low-tension switchboard; Johnson and Phillips, Limited, low-tension cable; British Westinghouse Electric and Manufacturing Company, Limited, four 1,050-1,320 KW. rotary converters for sub-stations; Bruce Peebles and Company, Limited, two 1,050 KW. motor converters and two 200 KW. positive traction boosters for sub-stations; Mirrlees Watson Company, Limited, alterations and additions to condensing plants; Alton and Company, high and low pressure steam and water pipework; J. Hopkinson and Company, Limited, Huddersfield, valves; British Insulated and Helsby Cables, Limited, cables.

Beneficial Latitude.—Alderman F. A. Dunsford, chairman of Southampton Tramways Committee, at the February meeting of the Council, stated that a short time ago the committee were given sanction to purchase copper and rails, and they bought copper at £78, while it was now £122 per ton, £95 being obtained for the old metal. They also bought rails at £7 10s., which could not now be got under £14, and probably not at all. They had authorised the manager to purchase certain things, and he asked the Council to allow them a certain amount of latitude.

Sheffield Electric Supply Committee have adopted tenders as appended:—Supply of a turbo-alternator, C. A. Parsons and Company, £37,625; supply of three boilers and accessories, Stirling Boiler Company, Limited, £34,400; extension of condensing water service and constructing concrete discharge chamber at Neepsend power station, E. Taylor, Limited, £3,560; levelling site for coal storage and laying steam crane track, J. E. Nadin, £3,802; supply and delivery of six-panel, ironclad, h.t., two-phase switchboard for Forncett Street sub-station, A. Reyrolle and Company, Limited, £645 11s.

Glasgow Tramways Committee have accepted the following tenders:—Liverpool Electric Cable Company, and of Pirelli, Limited, for V.I.R. cable; British Westinghouse Company, for commutators; General Electric Company, Limited, and Edison and Swan Company, for traction lamps; Simplex Conduits, Limited, for lighting conduits and fittings. The City Council have been recommended by the Electricity Committee to accept the subjoined tenders:—British Westinghouse Company, Limited, one 6,000 KW. turbo-alternator and condensing plant, at £25,622, for the Port Dundas station; Willans and Robinson, Limited, one 6,000 KW. turbo-alternator and condensing plant (with Dick, Kerr alternator), at £25,480, for St. Andrew's Cross station.

FOR HIGH-CLASS
CONDENSING PLANT
WRITE TO
THE MIRRLEES WATSON CO., LTD.,
SCOTLAND STREET, GLASGOW.

Digitized by Google

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

Applications for Letters Patent.

Anderson, J.—Electro-magnets for brakes (1,811).
Babbington, F.—Mudguard for motor vehicles (2,567).
Barker, G.—Motor vehicles (2,811).
Birtill, G. S.—Increasing leverage on brakes automatically (1,438).
Caterpillars Tractors, Limited (*Holt*).—Endless tracks for vehicles (2,526).
Chavalier, F.—Anti-friction car wheel (1,601).
Couse, F. A.—Trolley wheels (1,842).
Deterding, C. A. G.—Tire for motor vehicles (2,181).
Ellison, G.—Electro-magnets for brakes (1,811).
Fraser, F. A.—Guards for road vehicle wheels (1,493).
G. and V. R., Limited.—Motor vehicles (2,130).
Geiger, C. A.—Truck or trailer for vehicles (1,880).
Lycett-Green, E.—Lighting devices for road vehicles (2,023).
Grice, A. G.—Motor vehicles (2,130).
Hayward, H. R.—Trolley head replacement devices (1,983).
Hollands, C. L.—Railway point and signal apparatus (1,747).
Howell, D. G. A.—Mudguards for motor vehicles (2,567).
Hutchins, T. L.—Joints of railway rails (2,670).
Jacobs, S. G.—Bodies of motor road vehicles (1,734).
Jensen, J. T.—Self-acting screw couplings for railway cars (2,187).
Killen, E. B.—Attaching or suspending under varying loads, axles, wheels, carriages, etc. (2,401).
McNeale, H. T.—Safety guards for motor vehicles (1,914).
Mingay, F. H.—Driving gear for motor vehicles (2,222).
Monts, P. de.—Road trailing vehicle (2,237).
Mozley, J.—Increasing leverage on brakes automatically (1,438).
Negrini, G.—Semi-automatic compressed air brakes (1,485).
O'Donnell, J. P.—Electrically-operated indicating apparatus for signalling on railways (2,266).
Powell, L. Jones.—Railway carriages and tramcars (2,376).
Rosenbaum, M.—Trolley wheels (1,842).
Ruffell, F. W.—Joining rails with fishplates and chairs (1,528).
Russell, R.—Accumulator-charging systems for vehicles (2,384).
Rymer, W. E.—Brake apparatus (1,947).
Sadler, S.—Control handle for motor-propelled vehicles (2,610).
Sharman, W. A.—Electrical signalling systems (1,921).
Snell, C. Scott.—Lighting road vehicles (1,714).

ORIENTAL

Behind ORIENTAL Seamless Steel Tubes is 30 years' experience

—experience concentrated in highest grade tube manufacture—and to-day we confidently claim that for quality, strength, and accuracy, ORIENTAL Tubes are unsurpassed.

Send us your enquiries—we can quote you keenest prices and promptly and effectively meet your every "tube" need.

ORIENTAL TUBE Co., L'd., West Bromwich

'Phone: 45, West Bromwich. Wires: "Tubes, West Bromwich."

SEAMLESS STEEL TUBES

Specifications Published.

1914.

Cleathero and Spurr.—Universal lifting and turning jack for mechanical vehicles (23,390).
Pallavicini.—Spring suspensions for vehicles (24,100).

1915.

Bell and Jones.—Locking arrangements for differential gears on the axles of motor wagons, etc. (5,204).
Boot and Scourfield.—Electric signalling systems (5,076).
British Westinghouse Electric and Manufacturing Company, Limited.—Electric motor control systems (12,310).
Bruce and Williams.—Railway sleepers and rail fastenings (1,680).
Cloud.—Fluid pressure braking apparatus (928).
Conradi.—Motor vehicles (9,994).
Cronk and Mottershead.—Ticket punches (3,252).
Gill (*Hatfield Rail Joint Manufacturing Company*).—Rail joints (8,407 and 12,123).
Höchstädter.—Stranded electrical conductors for overhead power transmission (1,234).
Hollands.—Point and signal mechanism for railways (391).
Kendrick.—Rail crossings (13,996).
Leeds Forge Company and Houldcroft.—Railway vehicles (1,759).
McDonnell.—Starting mechanism for motor vehicles (1,235).
Mears.—Chairs for railway rails (420).
Parkinson.—Anti-creeping devices for railway rails (9,752).
Porsche, Reik and Oesterreichische Daimler-Motoren Akt.-Ges.—Road vehicle trains (2,084).
Rendell.—Fluid-pressure braking apparatus (1,339).
Samuel, Slingo and others.—Brake for electrically-propelled vehicles (9,915).
Scott.—Motor vehicles (1,294).
Shuttleworth and Shackleton.—Electric transmission systems for motor vehicles (10,420).
Simms.—Motor-propelled vehicles (7,222).

Colonial and Foreign Tramways Traffic Returns.

Name of Company.		1915. Weeks Ended. Feb. 6.	Feb. 13.	Feb. 20.	Feb. 27.	1916. Weeks Ended. Feb. 5.	Feb. 12.	Feb. 19.	Feb. 26.	Aggregate. Wks.	1916.	Increase or Decrease.
		£	£	£	£	£	£	£	£		£	£
Anglo-Argentine		50.295	51.560	47.578	50.712	49.591	50.263	50.359	48.957	8	395.241	− 7.666
Auckland		22.164	(28 days)	...	...	22.868	(28 days)	...	...	28	148.708	+ 1.612
Burma	Rs.	3.525	3.577	3.727	3.466	3.512	3.708	3.614	3.315	30	..	+ 6.658
Calcutta	Rs.	64.894	66.435	62.934	64.281	68.107	65.433	68.165	66.877	...	488.670	+ 27.573
Madras	Rs.	(2 weeks)	27.430	...	...	(2 weeks)	29.860	...	...	6	96.243	+ 11.427

Companies Issuing Monthly Statements.

		1914. Sept.	October.	Nov.	December	1915. Jan.	Feb.	1915. Sept.	October.	Nov.	December	1916. Jan.	Feb.	Wks.	Aggregate. 1915-16.	+ or −.
		£	£	£	£	£	£	£	£	£	£	£	£		£	£
Brazilian Street Mlrs.		...	...	...	...	...	...	...	...	...	...	...	...	...	—	—
BrazilianTraction Mlrs.		6.096.940	6241170	5929730	6.010.490	...	...	6.494.000	6793000	6336000	6.527.000	...	...	52	77.113.110	+3.761.632
Brisbane		28.031	28.763	28.600	30.890	29.620	...	30.360	31.880	31.120	33.960	32.280	...	5	32.280	+ 2.660
British Columbia	$	650.516	661.000	648.485	674.063	...	...	517.022	538.826	562.782	603.667	...	...	26	3.240.146	− 758.753
Buenos Aires Pt. & C.		...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze		40.333	42.341	42.256	44.000	43.301	...	39.355	42.516	42.603	43.528	40.596	...	30	291.525	− 4.741
Cape Town		...	...	...	...	...	...	13.310	...	13.870	16.589	16.030	...	—	—	—
Carthagena & Herrerias		2.175	1.543	1.379	1.255	904	1.822	1.252	2.169	2.090	2.129	2.841	1.585	8	4.426	+ 1.700
Cordoba		12.384	12.904	12.468	12.091	...	...	13.213	13.433	13.785	13.025	...	...	34	124.148	+ 4.718
East India		1.980	2.007	2.029	1.839	1.914	...	2.054	2.069	2.065	2.062	2.015	...	26	12.531	+ 650
Kalgoorlie		2.864	2.525	2.414	2.905	...	...	2.997	2.675	2.611	3.018	...	...	52	33.420	+ 1.596
La Plata		3.598	4.540	4.540	4.452	4.540	4.016	3.894	4.405	4.545	4.564	4.533	4.346	8	8.879	+ 331
Lima		28.717	30.646	29.712	32.411	33.043	...	30.543	32.208	30.703	34.685	34.014	...	52	385.854	− 7.338
Manila	$	116.300	125.750	129.000	132.500	...	...	123.946	124.131	129.447	141.350	...	...	52	1.495.534	− 108.031
Melbourne		.	...	...	...	...	...	61.211	...	...	72.658	...	...	..	—	—
Mexico	$	...	...	...	...	...	...	...	...	...	...	...	...	..	..	—
Montevideo		25.226	26.500	27.081	28.605	32.459	30.008	25.070	27.167	28.407	31.305	34.252	32.502	17	126.466	+ 8.313
Port Elizabeth ...		...	...	...	...	...	...	2.927	...	3.110	4.360	4.193	...		...	—
Puebla	$	...	...	...	...	...	...	...	...	...	...	...	...	..	..	..
Rangoon		4.119	4.600	4.405	4.459	4.689	...	4.445	4.886	5.028	4.492	4.763	...	5	4.763	+ 74
Toronto	$	879.321	849.636	824.634	...	...	..	804.902	792.001	851.113	...	...	...	48	8.793.719	− 502.658
Winnipeg ...	$	310.996	330.562	330.398	368.400	...	..	261.982	286.146	323.025	377.121	...	...	52	3.499.741	− 601.561

(Continued on page 214)

Digitized by Google

TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED. Feb. 6	Feb. 13	Feb. 20	Feb. 27	1916. WEEKS ENDED. Feb. 5	Feb. 12	Feb. 19	Feb. 26	AGGREGATE. Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	1,509	1,507	1,564	1,550	1,682	1,689	1,634	1,646	38	68,591	+ 4,534
Accrington Corporation	443	...	...	...	534	...	...	...	44¾	24,521	+ 1,014
Ayr Corporation	228	211	226	215	265	251	259	249	42	15,147	+ 1,078
Bath Electric	*	...	...	...	...	...	...	...	—	—	—
Birkenhead Corporation	1,206	1,139	1,199	1,180	1,389	1,360	1,372	1,326	47½	65,769	+ 6,086
Birmingham Corporation	12,266	11,922	12,251	12,140	15,352	15,277	15,529	14,545	48	690,085	+107,785
Blackburn Corporation	964	1,000	996	1,037	1,091	1,074	1,050	1,045	47¾	59,547	+ 222
Blackpool and Fleetwood	346	278	283	290	370	283	288	273	8	2,572	+ 128
Blackpool Corporation	833	596	578	612	1,090	743	679	661	48¾	75,272	+ 2,943
Bolton Corporation	2,493	2,426	2,569	2,394	2,575	2,648	2,550	2,465	48¼	128,217	— 259
Bournemouth Corporation	1,685	1,680	1,781	1,755	1,886	1,907	1,818	1,690	48	100,719	+ 5,447
Bradford Corporation	5,553	5,981	5,710	5,618	6,215	6,046	5,936	5,653	48¾	306,124	+ 12,952
Brighton Corporation	786	766	801	768	882	888	831	725	47½	51,850	+ 1,064
Bristol	8,436	7,980	8,250	8,189	9,403	9,165	9,106	8,664	8	74,192	+ 7,385
Burnley Corporation	1,418	1,390	1,378	1,397	1,659	1,590	1,512	1,445	48¾	76,601	+ 3,163
Burton-on-Trent Corporation	265	249	254	256	273	225	220	216	48	13,649	- 386
Bury Corporation	1,172	1,103	1,213	1,151	1,232	1,235	1,209	1,153	47½	63,894	+ 470
Cardiff Corporation	2,428	2,404	2,439	2,349	2,683	2,613	2,712	2,509	47	128,550	— 107
Chatham and District	946	972	931	955	1,033	1,033	1,079	984	8	8,299	+ 751
Chesterfield Corporation	236	235	232	239	249	248	251	253	47	12,715	+ 170
Colne Corporation	208	216	219	255	241	235	228	218	—	—	—
Cork Electric	420	426	440	408	472	452	447	421	8	3,584	+ 176
Croydon Corporation	1,524	1,567	1,450	...	1,602	1,568	1,625	...	46	84,235	+ 5,552
Derby Corporation	903	875	903	873	1,062	954	1,032	858	47¾	49,868	+ 2,381
Dover Corporation	244	238	235	237	254	244	247	236	47	14,483	+ 2,314
Dublin and Lucan	118	108	109	112	128	111	109	109	8	915	+ 5
Dublin United	5,621	5,422	5,426	5,100	5,912	5,599	5,749	5,547	8	46,956	+ 3,083
Dundee City	1,179	1,200	1,197	1,173	1,339	1,294	1,294	1,278	40½	55,312	+ 3,351
East Ham Corporation	1,248	1,268	1,197	1,218	1,172	1,162	1,211	1,141	47¾	61,960	+ 5,577
Exeter Corporation	294	291	298	281	328	316	324	294	47	17,592	+ 1,023
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	20,021	19,817	20,091	19,745	22,634	21,581	21,769	21,446	39	846,622	+ 64,351
Glasgow Subway	1,079	1,103	1,083	1,077	1,251	1,232	1,247	1,236	8	10,133	+ 1,218
Glossop (Urban Elec. Supply Co.)	105	105	109	109	134	125	127	106	9	1,169	+ 205
Halifax Corporation	1,897	1,892	1,904	1,957	2,093	1,925	1,890	1,867	46½	103,003	+ 1,013
Hastings and District	664	718	670	732	728	724	714	644	8	5,865	+ 289
Huddersfield Corporation	2,227	2,175	2,272	2,246	2,645	2,562	2,620	2,405	47	126,604	+ 17,141
Hull Corporation	2,966	2,926	2,985	3,011	3,094	2,993	3,089	3,118	47	147,043	- 840
Ilford U.D. Council	562	558	557	540	605	597	613	568	47	30,610	+ 3,391
Ilkeston Corporation	111	112	113	115	145	130	126	127	48	6,465	+ 408
Ipswich Corporation	298	358	359	354	449	474	495	450	46	25,617	+ 4,572
Isle of Thanet	238	226	212	228	224	239	230	198	21	5,361	- 957
Kilmarnock Corporation	147	143	144	142	165	156	161	150	41	6,894	+ 303
Lanarkshire	1,648	1,660	1,711	1,669	2,170	2,108	2,044	2,198	8	17,161	+ 3,071
Lancashire United	1,459	1,495	1,467	1,533	1,616	1,545	1,581	1,584	51	12,580	+ 829
Leeds City	7,925	7,632	7,978	7,935	8,957	8,553	8,790	8,438	48	426,145	+ 34,508
Leicester Corporation	2,747	2,733	2,769	2,766	3,072	3,143	3,241	2,975	8	25,952	+ 3,290
Leith Corporation	639	623	620	616	763	748	711	726	41	31,551	+ 2,662
Leyton U. D. Council	1,533	1,335	1,490	1,513	1,454	1,441	1,456	1,402	47	75,363	+ 9,059
Liverpool Corporation	12,639	11,940	12,213	12,131	13,338	12,837	13,004	12,479	8½	108,842	+ 8,011
Llandudno and Colwyn Bay	175	181	178	194	190	190	194	184	12½	2,333	+ 146
London County Council	45,591	46,816	44,663	46,281	44,290	44,255	44,691	44,285	47	2,086,074	- 6,484
London General Omnibus	*	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	131	144	142	141	117	118	124	125	20½	2,731	- 840
Maidstone Corporation	152	157	148	155	180	171	171	164	47	10,119	+ 507
Manchester Corporation	16,428	15,841	16,481	16,223	17,153	16,919	17,181	16,811	47	846,358	+ 31,259
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	...	...	...	...	—	—	—
Nelson Corporation	141	151	158	177	183	179	193	192	47½	9,272	+ 643
Newcastle-on-Tyne Corporation	5,621	5,660	5,611	5,566	5,957	5,633	5,662	5,571	48	293,606	+ 28,702
Newport (Mon.) Corporation	721	705	732	706	848	819	846	803	48	40,272	+ 1,976
New St. Helens and District	846	827	799	839	903	873	886	882	34	34,617	+ 3,446
Northampton Corporation	603	612	592	633	678	680	673	649	47¾	34,191	+ 5,762
Nottingham Corporation	3,220	3,185	3,112	3,230	3,565	3,560	3,583	3,592	47	175,921	+ 14,123
Oldham Corporation	...	...	...	...	...	...	...	...	—	—	—
Portsmouth Corporation	2,083	2,021	1,968	2,013	2,182	2,061	2,189	1,833	48	116,385	—
Preston Corporation	827	847	806	819	992	982	990	959	47	46,124	+ 2,951
Provincial	1,816	1,747	1,795	1,829	1,990	1,930	1,954	1,826	21½	43,519	+ 3,224
Reading Corporation	643	657	634	659	736	722	763	696	47½	37,307	+ 4,071
Rhondda Tramways	1,074	1,075	1,048	1,102	1,223	1,186	1,161	1,147	8	9,325	+ 790
Rochdale Corporation	1,404	1,377	1,482	1,430	1,597	1,477	1,466	1,414	45½	80,251	+ 4,142
Rotherham Corporation	921	883	957	904	1,215	1,173	1,225	1,146	48	56,591	+ 8,133
Salford Corporation	4,582	4,527	4,694	4,449	4,934	4,990	5,041	4,793	47½	247,634	+ 11,963
Sheffield Corporation	7,844	7,603	8,133	7,763	9,442	9,383	9,501	9,067	48¾	439,981	+ 62,436
Southampton Corporation	1,160	1,197	1,133	1,194	1,389	1,387	1,409	1,396	47	70,653	+ 8,565
Southend-on-Sea Corporation	560	617	570	622	574	582	564	561	47	37,318	- 8,021
South Metropolitan Tramways	*	...	...	...	...	...	...	...	—	—	—
South Shields Corporation	669	670	663	655	735	722	713	719	47¾	37,514	+ 1,857
Sunderland Corporation	1,297	1,287	1,331	1,253	1,481	1,419	1,477	1,445	48	71,948	+ 2,505
Sunderland District	468	463	498	555	565	545	541	575	17	9,625	+ 897
Swindon Corporation	152	164	156	168	183	181	181	172	47	9,263	+ 874
Torquay Tramways	353	372	387	421	414	410	416	360	8	3,297	+ 233
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	498	476	493	508	524	503	489	490	8	3,878	- 3
Wallasey Corporation	1,049	995	1,035	1,013	1,141	1,090	1,106	1,084	47¾	59,998	+ 1,620
Walsall Corporation	679	641	684	639	906	787	774	663	9	6,566	+ 1,061
Walthamstow U.D. Council	724	686	678	702	765	751	788	733	48	41,856	+ 3,972
Warrington Corporation	414	422	412	414	486	470	496	481	47	21,990	+ 1,470
West Ham Corporation	2,729	2,776	2,659	2,773	2,979	2,954	3,005	2,882	47½	145,738	+ 12,495
Wigan Corporation	1,366	1,373	1,346	1,396	1,438	1,475	1,544	1,543	47	71,686	+ 2,960
Wolverhampton Corporation	980	951	967	987	1,105	1,109	1,083	812	48	53,864	+ 3,387
Yorkshire (West Riding)	1,524	1,311	1,399	1,481	1,555	1,701	1,515	1,437	9	14,463	+ 1,709

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

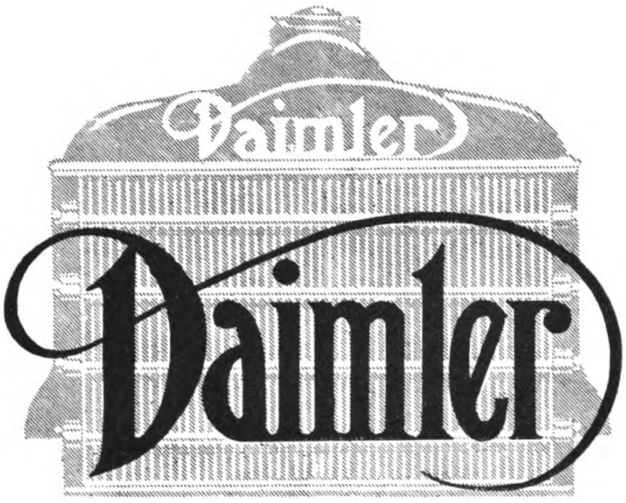
For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers).

For Places Abroad—
Thirty Shillings per annum.

Tel. No.: **2948** Gerrard.
Telegraphic Address: **"Tramigro," London.**

Amberley House, Norfolk St., W.C.

Digitized by Google



COMMERCIAL VEHICLES

THE choice of a Daimler by the largest users of Motor Lorries is based upon experience and proven facts of its efficiency and economy. Their records prove that the maintenance costs are the lowest known. This is the prime consideration. The following Corporations and Firms have secured recent deliveries

BIRMINGHAM Corporation.
MANCHESTER Corporation.
SHEFFIELD Corporation.
Lanarkshire Tramways Co.
East Surrey Traction Co., Ltd.
Whitehaven Colliery Co., Ltd.
Greenfield Mill Co., Ltd.
Joshua Hoyle & Sons, Ltd., Manchester.
Coventry Metal & Iron Co., Ltd.
Joseph Evans & Co., Ltd., Birmingham.
CHESTERFIELD Corporation.
ROTHERHAM Corporation.
WALSALL Corporation.
Mansfield & District Tramways.
United Automobile Services, Ltd., Lowestoft.
John Croysdale & Sons, Ltd.
Alfred Hickman, Ltd., Bilston.
Galloways, Ltd., Manchester.
Ewarts, Ltd., Dudley.
Christopher Collins, Ltd., Birmingham

To secure quick delivery time is saved by stating, when enquiring, exactly the work on which the vehicle will be used, for every application must be sanctioned by the War Office before delivery can be given.

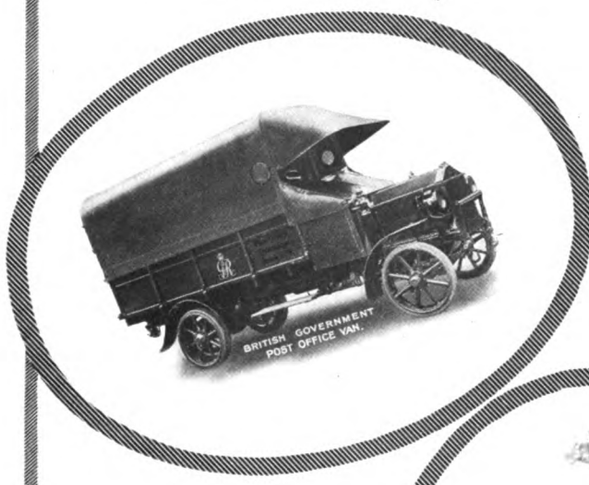
The Daimler Company, Ltd.

COVENTRY

LONDON: 27-28 Pall Mall.
BIRMINGHAM: Daimler House, Paradise Street.
MANCHESTER: 60, Deansgate.
NOTTINGHAM: 98, Derby Rd.
CARDIFF: Park Street.
LEEDS: Harrison St., Briggate.
NEWCASTLE: St. Mary's Place.
BRISTOL: 61, Victoria Street.

Digitized by Google

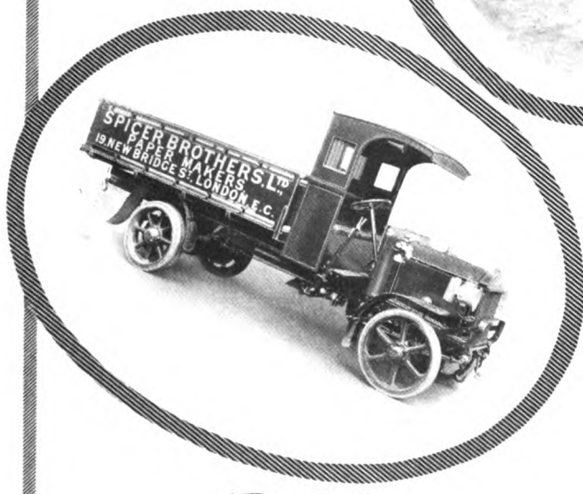
A FEW TYPES OF NAPIER BUSINESS VEHICLES

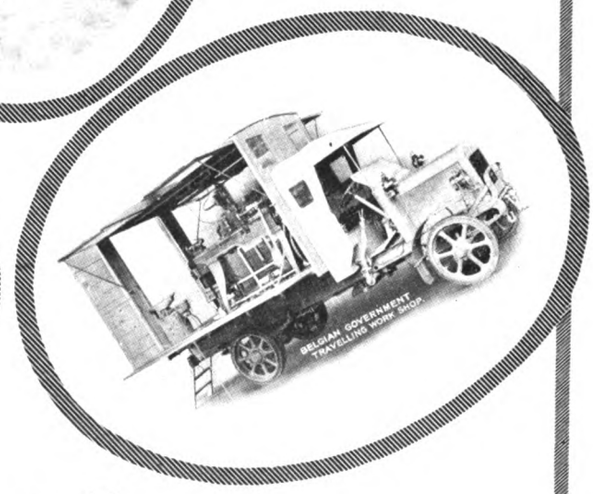


TO CARRY 30-45 CWT.

TO CARRY 3½ TONS.

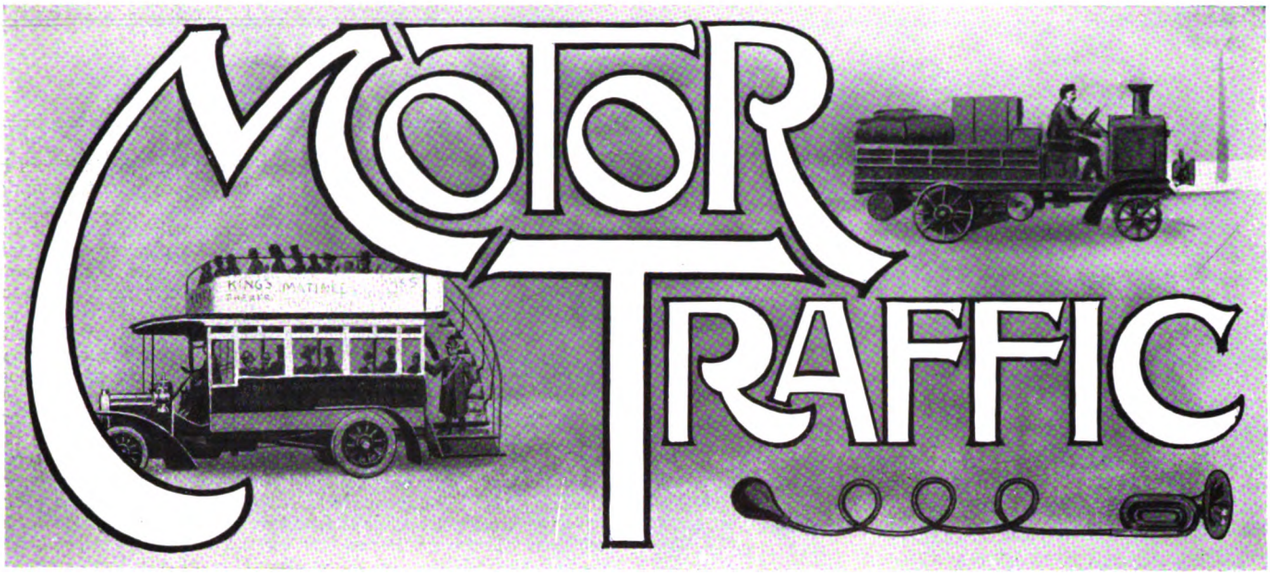
ENTIRELY BRITISH.





D·NAPIER & SON, LTD
14, NEW BURLINGTON ST., LONDON, W.
WORKS: ACTON, LONDON W.

Digitized by Google



The recent developments in the matter of petrol prices are both confusing and serious. It is most difficult to account for what has taken place. The "Shell" people are evidently facing something in the nature of a shortage due to the fact that, according to their own statement, they are supplying five times as much petrol for Government purposes as their competitors. In view of this, they not unnaturally suggest that motor users should be as economical as possible. Digressing for an instant to a matter that is perhaps to a greater degree one for the consideration of private motorists rather than the owners of industrial vehicles, this would seem to amount to a hint that the large slow-speed American type of engine is not exactly the right thing to be used in this country nowadays. The point only concerns our readers as such so far as they may be contemplating the purchase of new vehicles—and particularly of light vans—and so far as it may be possible to save petrol by careful carburetter adjustment and good driving. The proprietors of "Pratt" spirit apparently are not suffering from any shortage of supplies, but realising that this happy state of affairs does not apply to the "Shell," it is to be assumed that they see an admirable opportunity of getting the bulk of the business at almost any price they choose to fix. Hence the sudden rise that has caused petrol of the lightest qualities to touch 2s. 6d. a gallon. Now the suppliers of "Shell" and "Crown" spirit are in a rather awkward position, not altogether unlike that occupied for some time past by British industrial vehicle manufacturers. Owing to their Government contracts, they cannot supply all civilian demands, and they are in danger of their goodwill being diverted into other hands. In view of this, it is evidently in their interests to obtain at least the moral support of the motoring community, so that when the time comes there may be a strong tendency in many quarters to go back to "Shell" even if, as is more than probable, the prices of the various spirits are then equalised. In this position they have apparently considered it the best policy not to join at once in any further increase in price, but to retain 2s. 2d. as their top limit. This is satisfactory so far as it goes, but unfortunately it does not go far enough, and in view of the possibilities of still further taxation petrol users who are not secured by fairly long-distance contracts are not unreasonably nervous.

* * * * * *

The number of vehicles in municipal service continues steadily to grow, and the war does not appear to have checked developments in this respect to any degree. The demands of public services are usually of so imperative a character that they must be met by some means or another. Many corporations and local authorities found themselves in serious difficulties at the outbreak of war owing to the extensive requisitioning of their horses, and, in many cases, of their motor vehicles as well, and not all of them have yet succeeded in filling up entirely the gaps thus created. Horses have become scarce and dear, and thus if the requirements of municipal work were to be met at all it became necessary to buy motor vehicles, even for services wherein the advantages of mechanical as against horse haulage had not previously been universally acknowledged. The shortage of labour, too, has been a powerful contributory factor, and the necessity of adopting methods that gave the maximum of work done for the minimum number of men employed has become more vital as time has gone on. Thus, with horses unobtainable, except on more or less prohibitive terms, and increasing trouble in obtaining men, motor vehicles have been purchased, not only in spite of the various official requests for economy in expenditure, but in order to comply with such requests. These vehicles once having been purchased, however, it is essential that they should be worked to the utmost advantage, but there is reason to believe that in the majority of towns and cities this desirable end is far from being achieved. The prevalent habit of municipal organisations of resolving themselves into so many watertight compartments may seem to work tolerably well in practice, but when it is extended to the purchase, running, and upkeep of motor vehicles its advantages are merely theoretical and its drawbacks intensely real. This, however, is the system that prevails, with very few exceptions, almost everywhere, and the practical result is that many thousands of pounds of public money is being expended beyond what is strictly necessary. Municipal motor "fleets" have grown in a somewhat haphazard way, and with such rapidity that it is difficult to realise that the period of experiment is not so very long past. Even now there is considerable difference of opinion, not as to the advisability of utilising mechanical transport, but as to the exact form that it is best to employ—petrol, steam in one or other of its varying forms, or electric. As a matter of fact there is, more often than not, scope and need for all three.

Digitized by Google

MOTOR TRAFFIC.

In the foregoing circumstances, motor vehicles having definitely taken their place in the municipal scheme, the obvious next stage is that of utilising their capabilities to the utmost advantage. To secure this, it is necessary that in every town or area the question of motor transport as it affects the activities and undertakings of the local authorities should be considered separately and as a whole. In cases where local authorities have a tramway committee the organisation is a simple matter; the motor vehicles come naturally under the care of that committee, and form a department under the direction of the tramways manager. This has already been done with excellent results in several towns. In towns where there are no tramways a transport or "traffic" department should be set up, with its own committee, under whose charge should come every vehicle of whatever kind in the authority's service. Such a committee might normally consist of representatives of all the other departments, with someone having special knowledge of motor vehicles and haulage at its head. It should be responsible for the purchase, maintenance, and use of every van, lorry, or car of any description. The application of this method to the many and various vehicles used in municipal services generally is a necessary step, and is merely applying a principle that has worked excellently, and, indeed, been found indispensable, in private undertakings. It might be urged that the diversified character of the work to be done in corporation service would create difficulties, but this contention will be found to be largely based on preconceptions inevitably arising out of the "water-tightness" previously referred to; and in any case the variety of requirements in the case of one of the larger retail stores, or a business like that of Messrs. Lyons and Company, the caterers, are certainly not less than those of the average public authority. The management of a large fleet of motor vehicles is a business in itself, and where a number of cars are in use, under no general control, but worked in small groups, each in the charge of someone to whom their running and maintenance is merely one of a number of duties, it will inevitably be found that they are giving less than the maximum of return for the money spent upon them. In the ordinary way it might not appear to be a favourable time in which to alter existing arrangements, but the centralising of municipal transport and haulage should commend itself in these times as a useful step towards greater efficiency of vehicles and men and consequent substantial saving of money.

BIRMINGHAM OMNIBUS SERVICE.

Its Importance to Munition Work.

The corporation and company tramway undertakings in connection with which motor omnibus services have been inaugurated during recent years have found the additional facilities of untold value for the conveyance of munition workers. In recent issues we have described the great and increasing use that is being made of the Sheffield Corporation omnibuses. Not less noticeable is the experience of the Birmingham Corporation Tramways Department in that work of national importance. At the February meeting of the Corporation, Councillor Harrison Barrow, chairman of the Tramways Committee, said there was an enormous demand awaiting the new omnibuses recently ordered, particularly for munition workers' transport.

Apart from the requests for new or increased services, the vehicles in use at Birmingham—the Tilling-Stevens petrol-electric machines—enjoy great popularity on account of the absence of jerkiness in starting and stopping. The fleet is 41 strong, a number that marks it out as the largest running under the control of a local authority in this country. In the exercise of a commendable foresight the Corporation, in 1914, took over the local omnibus company's business within the city boundary, while continuing to give the company facilities for bringing through traffic into the city from numerous outside towns and districts.

The Corporation omnibus service was inaugurated on the Selly Oak to Rednal route on July 19, 1913, and on a turnover of £5,092 to March 31, 1914, the sum of £1,682 was carried to profit and loss account. For the year ended March 31, 1915, the accounts show a gross profit of £4,549. On the capital account the expenditure totalled £7,843. On the revenue account the outlay during the year was £18,826, equal to an average of 9·108d. per car-mile. Of that total traffic expenses came to £6,925, and repairs and maintenance £5,965. The income totalled £23,376, equal to an average of 11·310 per car mile. The expenditure on repairs and maintenance was slightly less per mile run than for the preceding year, notwithstanding the addition of the undertaking of the local omnibus company, including omnibuses and reconstruction work at garage. This acquisition accounts for a sum of £32,176 as the only item in the tramways suspense account, while the reserve fund account includes on the debit side the item of £1,658 for "reconstruction of Bournbrook depot, including new motor omnibus garage." The subjoined table provides some interesting comparisons:—

BIRMINGHAM CORPORATION MOTOR OMNIBUSES.

Year ended March 31, 1915.

		Average per mile run.	
	1915	1915	1914
	£	d.	d
RECEIPTS—			
Traffic receipts	23,181	—	—
Other receipts	195	—	—
Total	£23,376	11·310	12·357
EXPENDITURE—			
Petrol	4,576	2·214	2·566
TRAFFIC EXPENSES—			
Wages of inspectors, drivers, conductors, and other traffic employees	4,943	2·392	2·187
Cleaning and oiling	1,109	·537	·509
Fuel, light, water, etc.	576	·279	·236
Ticket check	106	·051	·055
Uniforms	181	·087	·086
Miscellaneous	10	·005	·059
	£6,925	3·351	3·132
GENERAL EXPENSES—			
Rents, rates, and licences ...	780	·377	·507
Printing and stationery	108	·052	·050
Law charges and compensations	110	·053	·002
Insurances	91	·044	·036
Stores expenses	146	·071	—
Miscellaneous	8	·004	·013
	£1,243	·601	·608
REPAIRS AND MAINTENANCE—			
Buildings and fixtures	127	·061	·013
Workshop tools, etc.	141	·068	·075
Rolling stock	5,698	2·757	2·894
	£5,966	2·886	2·982
NATIONAL INSURANCE ACT, 1911—			
Employers' contributions ...	66	·032	—
Allowance to employees O.H.M.S....	50	·024	—
Total	£18,826	9·108	9·288
Balance	£4,550	—	—

	1915.
Percentage of operating expenses to total revenue ...	80·54%
Average operating expenses per omnibus-mile (excluding petrol cost)	6·894d.
Omnibus mileage	496,038
Passengers carried	3,333,653
,, ,, per omnibus mile	6·72
Average fare per passenger	1·37d.
Operating expenses per passenger	1·35d.

Digitized by Google

MOTOR TRAFFIC.

OMNIBUSES AND ROAD MAINTENANCE.

A conference of representatives of the Birmingham Public Works, Tramways, and Watch Committees has been held to consider the effect of motor omnibus traffic on the city roads and the maintenance of the thoroughfares. The following resolution was adopted for recommendation to the respective committees :—" That the Tramways Committee be requested to furnish the Public Works Committee with a schedule of the roads which, in their opinion, should be reconstructed with a view to carrying motor omnibus traffic, and that in future the Tramways Committee should not run any motor omnibuses on any other road without first giving six months' notice to the Public Works Committee." It is understood that this resolution is not to apply to special services established for the convenience of workers engaged on Government work during the war.

Great damage has been caused to the main road between Barrow and Ulverston by the running of motor omnibuses, although considerable expenditure has been incurred in the effort to maintain the thoroughfare. Many of the passengers are munition workers. An intimation has been received by Lancashire County Council that the Local Government Board will sanction the raising of a loan of £10,000 for carrying out repairs. The Main Roads and Bridges Committee, according to Councillor Aspell, their chairman, are of opinion that an effort should be made to get some portion of the cost from the proprietors of the vehicles.

Representatives of Lancaster Corporation and of Lancashire County Council have for some time been considering the question of the maintenance of roads in the borough for which the county authority are responsible. The conference was the outcome of the application recently made by the Corporation for powers to run motor omnibuses.

Birmingham Motor Omnibus Company have arranged to run a service into Lichfield on the same conditions in regard to road maintenance, etc., as those obtaining in the districts affected by Walsall Corporation Act.

NAPIER LORRIES IN MALTA.

The illustration on this page is a reproduction from a small snapshot recently received from Driver Corner, M.T.A.S.C., who is at present stationed at Malta, and throws an interesting sidelight on the daily work of a lorry on war service in Malta. In the course of a letter to Mr. H. T. Vane, managing director of D. Napier and Son, Limited, he says :—" I enclose a snapshot of a Napier lorry which, with many others, is doing excellent work here. The photo. shows the lorry in a flood which occurred in the recent severe storm. Your lorries are a marvel in going through such strenuous work, working from first thing every morning until last thing at night, and very often all night. People at home cannot understand the amount of work being done here, and I am afraid they never will unless they see it with their own eyes.

" We have 25 of your lorries, and the work they do consists of conveying stores all over the island to the different forts and barracks, conveying washing from the hospitals and barracks to laundry, conveying mails from lighters at the wharf to post office and storehouse, conveying wounded sitting-up cases from the hospital ships to different hospitals, conveying convalescents from the hospitals to the convalescent camps. Every night one Napier lorry is detailed to take a certain picket to different places. Napiers are used for all sorts of jobs, and the heavy loads they take along the country roads—mere cart tracks—and the hills they climb are marvellous. They are a very nice car to drive, and it is child's play to change the gears. They require very little attention."

Napier Lorry in a Flood at Malta.

THE NEED FOR NON-SKID RUBBER TIRES.—While a motor omnibus belonging to the Northern General Transport Company was passing through Chester-le-Street, on the night of February 5, it skidded from the left to the right side of the road and across a very broad footpath. A soldier and a woman who were standing on the path sustained injuries to their legs.

Digitized by Google

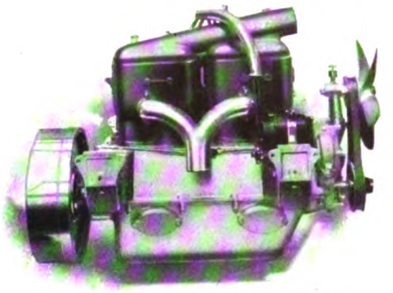
MOTOR TRAFFIC.

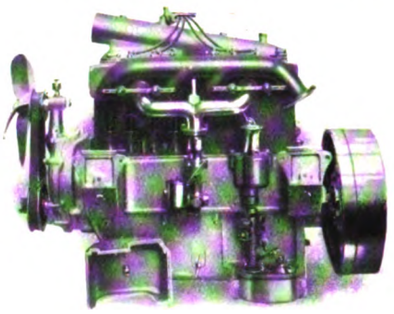
THE HALLEY CHASSIS.

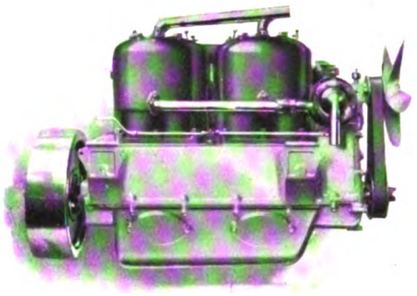
"Halley History" is the title of a 50-page art publication issued by Halley's Industrial Motors, Limited, of Yoker, Glasgow, and 46-52, Vauxhall Bridge Road, London, S.W., Manchester, Newcastle-on-Tyne, Liverpool, Montreal, Melbourne, and Sydney. Halley vehicles are used in municipal service, fire extinction, and for commercial and industrial purposes at home or abroad. There has been a marvellous development of the business since it was established in 1901 to undertake the manufacture of steam vehicles. The works and head offices at Yoker cover many acres; the number of employees has risen from a small total to over eight hundred; and the output has increased twenty-five fold.

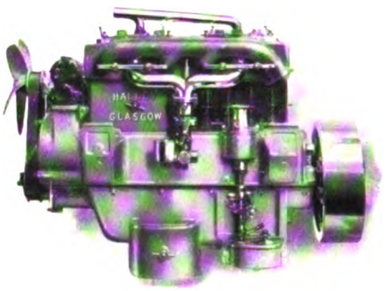
in the purchase price, and discerning buyers, who, we maintain, now very greatly predominate, know this as well as we do." From the beginning an adequate supply of replacement parts has been maintained, and the company take particular care to record all changes of ownership brought to their notice.

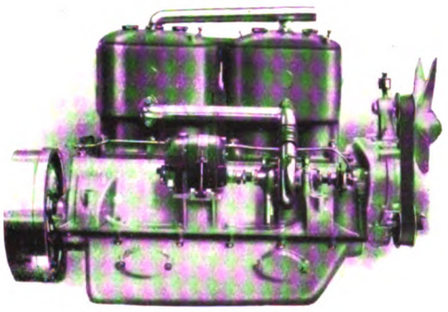
More than half of the book is required for "The History of a Halley Chassis," some stages in which we are able to illustrate. The standard 3-ton chassis is the model in principal demand. The engine design embodies the use of cylinders cast in pairs, giving greater rigidity of the engine as a whole, a marked reduction in the number of connecting pipes, joints, etc., and the admissibility of more efficient water-jackets, as compared with the practice of employing a single casting for the four cylinders. The twin arrangement permits the removal of the cylinders without the use of lifting tackle.



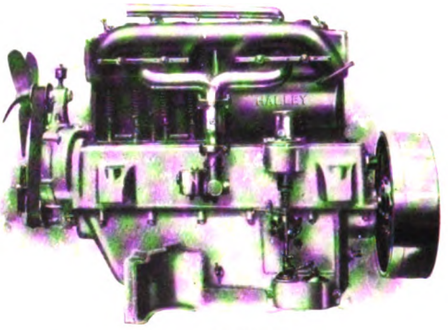








Near Side View.



Off-Side View.

Halley Engines of 25, 35 and 45 H.P.—Fitted as Standard to Vehicles of from 1½ to 6 Tons Capacity.

The Halley petrol machine has been evolved since 1905 from a very successful Halley steam wagon. In 1907 the Royal Automobile Club held the commercial vehicle trials, in which two Halley vehicles took part, with the result that one gained the gold medal and the other the silver medal, the company also securing the special award for accessibility, simplicity, and freedom from liability to breakdown. Their reputation has become worldwide, alike for the excellent work of their chain-driven chassis overseas and in heavy work in this country, as well as for the performance of live-axle vehicles in passenger work and for light or medium loads of goods.

A chapter devoted to "Halley Policy" may be summed up in the following quotation:—"A motor lorry that has to bring to its owner a certain and definite return on the amount paid for it must essentially have more to recommend it than any questionable saving

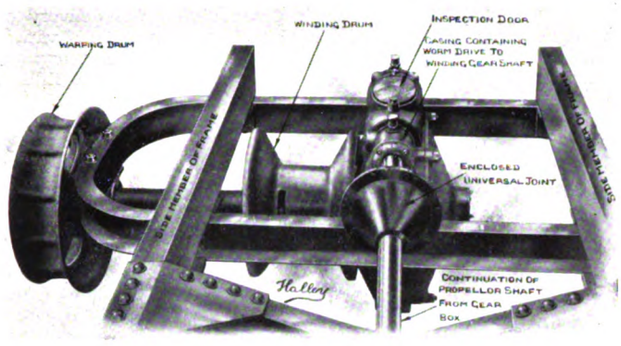
A great amount of delicate work has to be executed upon cylinders fresh from the foundry before the engines present the finished appearance shown in the appended near and off-side illustrations.

No better testimony to the reliability of the Halley crank shaft could be forthcoming than the statement that only one breakage has occurred. The four stages of manufacture from a solid bar of nickel chrome steel are shown on the opposite page. This and all other parts are subjected to rigorous examination and test before being taken over by the stores department. Another indication of the care used in these works is that the cam shaft is turned from a solid bar, and not from drop forgings. The importance of the work of the cam shaft will be appreciated from the remark that it has to raise and lower eight large engine valves, controlled by heavy springs, one thousand times per minute.

Digitized by Google

MOTOR TRAFFIC.

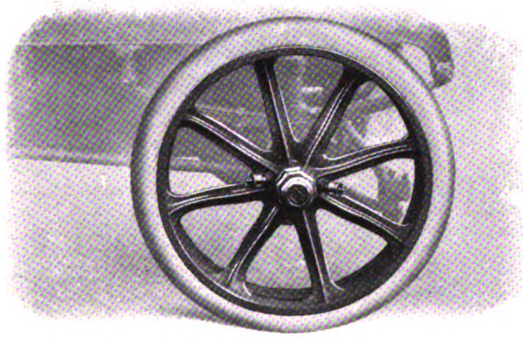
Every Halley engine is fitted with a governor, so set as to prevent the engine speed being greater than 1,000 revolutions per minute. To this method of preventing drivers from travelling miles per hour



Combined Hoisting and Winding Gear.

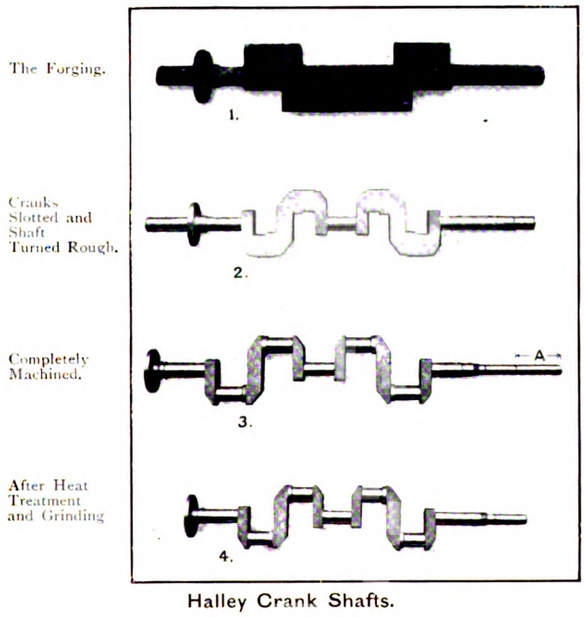
in excess of the designed speed is attributed the proven lasting qualities of these engines.

From the erecting shop the finished engine is transferred to the



Front Wheel.

testing department, where it is run for twelve hours from shafting. If this proves satisfactory, the engine is run under its own power by petrol, with all the accessories of a chassis. By means of a dyna-



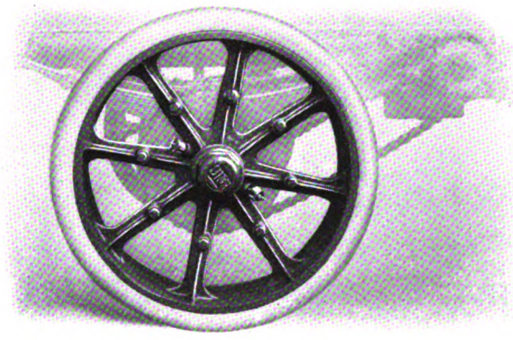
Halley Crank Shafts.

mometer a load is applied until the engine is developing its full power at 1,000 revolutions per minute, at which it is kept at full load for twenty-four hours. It is then dismantled, and every part is subjected to minute scrutiny.

The appended view of the gear box shows the device fitted to

Halley 3-Ton Gear Box Fitted to Type B Chain-Drive Models.

type B chain-drive models, having three speeds and reverse. From the start Halley's refrained from attempts to stiffen up a pleasure car gear to suit industrial use, and their original method has proved



Rear Wheel.

highly successful. They claim that their gear box remains, after a ten years' test, the finest piece of machinery found in any motor vehicle designed for heavy service. When the live axle was introduced for passenger or rapid goods delivery, the company arranged a gear box with a direct drive on "top gear," in order to secure the fullest benefit from the greater silence obtained with the worm-driven live axle as compared with the chain transmission. They are thus able to offer vehicles peculiarly adapted to any circumstances.

For much other interesting information our readers should consult

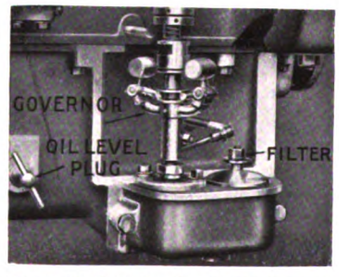


Illustration from Halley Book of Working Instructions, Showing Governor, etc.

the brochure itself, but we may mention that every chassis is given a test on the road, extending to about ten days. From 400 to 500 miles are traversed on the flat and on gradients, and until the chassis can show a satisfactory test sheet it remains at the works.

Colonial users are catered for by certain departures from standard, including increased road clearance and the substitution of 35 and 45 H.P. engines for those of 25 and 35 H.P. An addition to standard is shown on this page in the illustration of the combined hoisting and winding gear.

Digitized by Google

MOTOR TRAFFIC.

TWO DAIMLER LORRIES.

The accompanying photographs show two Daimler commercial vehicles recently delivered to two well-known manufacturers. The lorry supplied to Messrs. T. Mandleberg and Company is

a 3-ton machine, and that purchased by the Dukinfield Bleaching Company is a 2-ton vehicle. These illustrations are of particular interest to prospective buyers at the present time, as they show the standard War Office type bodies. Daimler lorries can now be supplied to firms engaged on Government contracts, but inquirers

should state fully the work on which the vehicles will be used, as every order must be sanctioned by the War Office before delivery can be given.

DECREASE OF LONDON LICENCES.

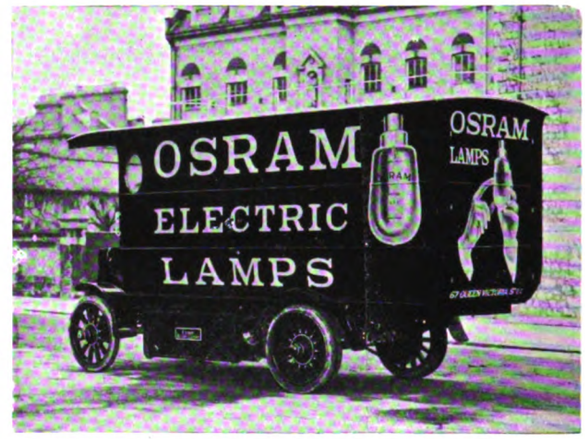
In the House of Commons the Home Secretary, on February 17, informed Sir H. Norman that the numbers of London licences for drivers and vehicles issued in July, 1914, and January last were as follow :—

	Jan., 1916.	July, 1914.
Motor cabs ...	5,813	7,746
Horsed cabs	946	1,666
Omnibuses ...	2,707	3,876
Tramcars ...	2,733	2,850
Hackney drivers ...	9,164	11,935
Stage drivers and composite	10,082	11,581
Assistant Conductors	12	25
Conductors ...	10,290	12,553

New Sheffield Service.—The recently instituted motor omnibus service of the Sheffield Tramways Department from Firth Park terminus to Ecclesfield is apparently proving successful.

THE "OSRAM" ELECTRIC VEHICLE.

We give below an illustration of the "Osram" electric vehicle which has lately been added to the fleet of express delivery motors employed by the General Electric Company for the delivery of Osram lamps to all parts of the United Kingdom. This van is handsomely finished in dark blue and presents a striking appearance. The gross weight is 2 tons 12 cwts., of which the Edison accumulator accounts for 16 cwts. The wheel base is 10 ft. 8 in. A load of two tons can be carried, the accommodation being sufficient for between 11,000 and 12,000 standard Osrams. The average



Edison Accumulator Vehicle.

speed on the flat is 10 miles per hour, and between 40 and 45 miles can be covered on one charge. Recharging is effected by a dynamo at the Osram-Robertson Lamp Works in Hammersmith. In addition to rheostatic braking, a system of band brakes is provided.

U.S.A. MOTOR INDUSTRY.

Mr. A. Reeves, secretary to the National Automobile Chamber of Commerce, United States, has recently published the following statistics concerning the American motor industry :—

American motor car production for 1916 will exceed ...	1,200,000
On the basis that any person with an income of £240 can own a car in the U.S.A., there is market for automobiles to the number of ...	5,000,000
Motor vehicles sold during 1915 ...	892,618
Retail value of cars and industrial motor vehicles sold in 1915 ...	£138,355,790
Passenger (pleasure) cars sold in 1915 ...	842,249
Retail value of passenger (pleasure) cars sold in 1915 ...	£115,171,290
Motor trucks (industrial vehicles) sold in 1915 ...	50,369
Retail value of commercial motor vehicles sold in 1915 ...	£25,184,500
Motor car sales almost doubled from 1907 to 1908, from 44,000 to ...	85,000
Number of carriages sold annually from 1908 to 1912 ...	1,000,000
Automobile exports to 80 different countries in 1915 exceeds ...	£20,000,000
In 1914 it was ...	£5,701,493
England is the best buyer of U.S.A. automobiles, taking for the year ended June 30, 1915, commercial motor vehicles, 5,306 ; pleasure cars, 8,321 ; valued at ...	£4,200,000
Estimated value of exports of commercial vehicles only, 1915 (increase)	£12,600,000
Estimated value of exports of pleasure cars during 1915 (increase 90 per cent.) ...	£7,400,000
Freight car loads of automobiles shipped during 1915 exceeded ...	200,000
Petrol consumed annually by automobiles (average of 400 gallons per car), gallons ...	980,000,000
Lubricating oil consumed annually (average of 12 gallons per car), gallons	28,800,000
Tires used annually on motor cars ...	12,000,000
Number of brands of tires used on motor cars, almost ...	125
Number of types and sizes of tires ...	140
Motor vehicles registered in the U.S.A. from State reports July 1, 1915	2,070,000
Total registrations for 1915 ...	2,400,000
Registered in New York State December 1, 1915 ...	231,713
Miles of public road in the U.S.A. ...	2,273,000
Money spent in U.S.A. on highway construction last year, which made for tremendous increase in real estate values, almost ...	£50,000,000

MOTOR OMNIBUS COSTS IN LONDON.

Although the report of the London General Omnibus Company for the past year does not state the number of omnibus miles run, and it is consequently impossible to arrive at the cost per omnibus mile from official figures, we believe that the working expenses have averaged 8¾d. per omnibus mile. Assuming this figure to be correct, there has been an increase in expenses of 1¼d. per omnibus mile in comparison with the previous year. In the circumstances, the result must be regarded as highly gratifying.

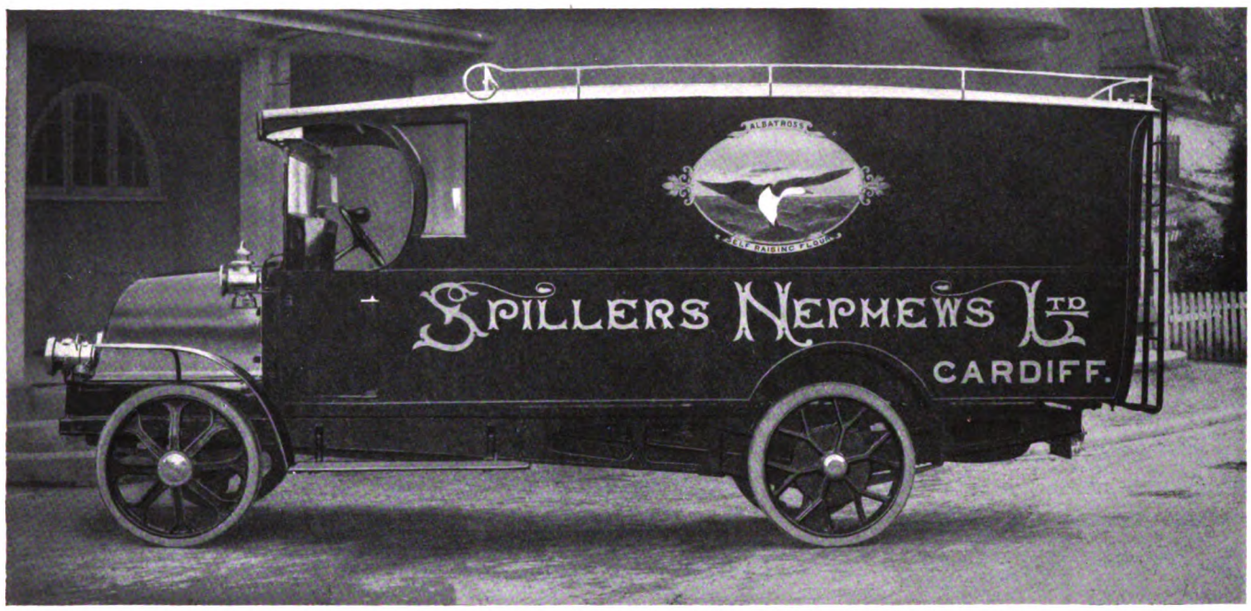
Digitized by Google

MOTOR TRAFFIC.

AN AUSTIN DELIVERY VAN.

One of the latest type delivery vans of the Austin Motor Company, Limited, Birmingham, is shown in the accompanying illustration. The body is mounted on a 2-3 ton Austin lorry chassis, and is handsomely finished. The design of the chassis embraces a number of distinctive features. The frame is of open girder construction. A novel arrangement of springs gives suspension, and at the same time ensures an unusual degree of lock for the front wheels, while the transmission and breaking stresses are taken up without undue strains upon the rear springs. The front springs are located within the frame line, and are of the usual laminated semi-elliptic type. The rear arrangement, however, is a complete departure from the usual practice. Two pairs of springs are used, one of each pair being placed below and the other above the axle, which, as will be noticed from our illustration, passes through the open work of the frame.

A special feature in the design of the front wheels is the fact that they are so dished that the pivots are located directly over the points of contact between the tires and the road, thus ensuring easy steering and the entire absence of protruding hubs. The wheel base is 11 ft. and the ground clearance 12 in. The chassis has a turning circle of 42 ft. The trade mark that appears on three sides of the van has been executed in its natural colours. The general colour scheme is tan brown, with black mouldings and gilt lines, and the whole decorative scheme makes a very effective advertisement for the owners. The convenience of the low loading platform is well illustrated in the photograph both as regards utility and general effectiveness. This feature of the design is specially notable.



Austin Lorry with Low Loading Platform.

PROVINCIAL DEMAND FOR OMNIBUSES.

New licences have been granted to Barrow Tramways Company for running motor omnibuses.

Lanarkshire Tramways Company have ordered four additional omnibuses, which will be put into service in March.

Manchester Tramways Committee have received the sanction of the Treasury to borrow £5,000 for the purchase of omnibus chassis.

At the February meeting of Birmingham Corporation, Councillor Harrison Barrow, chairman of the Tramways Committee, said there was an enormous demand for the motor omnibuses that had been ordered, particularly for munition workers' transport.

Halifax Tramways Committee have been directed to obtain estimates for the supply of two motor omnibuses. Tenders have been received for petrol, steam, and electric wagons for ash removal, but, before coming to a decision, the committee are obtaining information respecting battery vehicles in use elsewhere.

MOTOR VEHICLES FOR MUNICIPALITIES.

Rotherham Council are considering the advisability of purchasing more motor vehicles.

Ilford Council have placed an order for a 2-ton electric lorry for the use of the Tramways Department.

Cambridgeshire County Council have purchased two motor cycles for use in connection with highway work.

Salop County Council are allowing a sum of £25 a year to the Health Visitor towards the upkeep of a motor cycle.

Hyde Council have requested the War Office to agree to Leyland Motors, Limited, delivering a motor fire engine that had been ordered by the Corporation.

Marylebone Council have received a report from the Works Committee stating that it would be inexpedient to sell any of their horses at the present time with a view to substituting motor traction.

Rotherham Council have requested the chairmen of five committees to report as to the advisability of making arrangements by which the carting of the Corporation might be done by motor traction.

Manchester Gas Committee, who were the first provincial authority to purchase a coke-fired lorry, have ordered a second 3-ton coke-fired steam lorry chassis from the National Steam Car, Limited. These machines are in use by Hammersmith Council and by five gas companies in the London district, one company employing seven.

Sheffield Cleansing Department have recommended the purchase of a third electric vehicle for the work of the department. This is in consequence of the successful operation of the two Edison accumulator tipping wagons that have been in use since September, 1915, and the early part of January, 1916. The immediate purchase is declared to be necessary owing to the shortage of labour and the congested state of the work of clearing ashpits.

Hampshire County Council two and a half years ago provided a motor car, at a cost of £267, for the use of the inspector of weights and measures in the Basingstoke division of the county. The report of the General Purposes Committee for the year ended December 31, 1915, gives the following particulars of the cost of running the car :—

	Miles Travelled.	Cost of Running. £ s. d.	Cost per Mile. d.
Year ended June 30, 1914 ...	5,500	56 11 6	2·46
Year ended June 30, 1915 ...	5,350	52 15 10	2·36
Half-year ended Dec. 31, 1915 ...	2,505	26 5 6	2·51
Total for 2½ years	13,355	135 12 10	2·43

The running cost included petrol, lubricating oil, tires, repairs, and incidental expenses, including insurance. For depreciation no allowance has been made.

Digitized by Google

MOTOR TRAFFIC.

POPLAR COUNCIL have been advised by the Electricity and Works Committees to purchase a 4-ton Edison accumulator wagon and a 4-ton Foden steam wagon, each with a tipping body. The vehicles are required in order to effect the clearance of the increasing quantities of ash and clinker from the electricity and dust destructor works. At present the material is carted to shoots, where it is handled a second time, but owing to the shortage of men and horses, and the high price of fodder, the work has got into arrear.

MOTOR TRAFFIC NOTES.

TRANSIT NEEDS AROUND WOOLWICH.—Great success has attended the inauguration of motor chars-a-banc services between Sidcup, Eltham, Woolwich, and Dartford. War workers are the chief passengers, the return fare between Sidcup and Woolwich being sevenpence.

NEW WOOD-MILNE DEPOTS.—In order to meet the rapidly increasing demand for their tires, Messrs. Wood-Milne, Limited, have opened depots at 21, Albion Street, Gathorn, Manchester, and at 94, Albion Street, Leeds. Facilities for fitting solid tires are provided at each depot.

FOLKESTONE-DOVER MOTOR SERVICE.—Railway communication between Dover and Folkestone having been interrupted by a landslip, a half-hourly motor omnibus service has been instituted at a fare of 9d. for the single journey and 7d. if a book of tickets is taken. The railway fare was 6d.

PETROL AND MOTOR TAXES.—At a meeting of the Council of the Association of Municipal Corporations, held on February 17, a request was received from the Institution of Municipal and County Engineers to support an application to the Chancellor of the Exchequer for exempting local authorities and their surveyors from the payment of the increased duty in respect of motor spirit and local taxation licences. The Council resolved to take no action.

LIVERPOOL-MANCHESTER TRANSPORT COMPANY.—Owing to the inadequate railway facilities available between the Liverpool Docks and the Manchester district, the cotton manufacturers have been greatly inconvenienced. To overcome the difficulty they have organised the Cotton Industries Motor Transport Company, Limited, with offices at 4, Norfolk Street, Manchester, under the management of Mr. W. A. Cocking. It is proposed to garage a fleet of ninety vehicles in the horse tramway depot at Chorlton Road.

ERITH AND OMNIBUS POWERS.—On February 23, Woolwich Borough Council received an intimation from Erith Urban Council stating that they had decided to amend their application for powers to run motor omnibuses by asking for powers to run within the borough, and asking whether the Council's conditional consent, previously given, would apply to the amended application. The clerk was directed to reply that the Council would require information as to the route or proposed routes before giving consent to the amended application.

WOMEN AMBULANCE DRIVERS IN LONDON.—Since December last the Metropolitan Asylums Board have employed women as drivers of their motor ambulance vehicles. On February 8 the London County Council agreed to make an experiment in staffing with women one of the ambulance stations under the control of the chief officer of the Fire Brigade. This service, which deals with street accidents, etc., was instituted last year. The women, who will receive the same wages as are paid to the male drivers, will undertake the entire charge of one ambulance and its station.

SPEED AND MILEAGE RATINGS OF ELECTRICAL VEHICLES.—The American Society of Automobile Engineers have adopted the following recommendations of the Electric Vehicle Division with regard to standard ratings in connection with the mileage and speed of electrical motor vehicles :—

Electric vehicle speed ratings shall be based on continuous operation with one-half load over hard, smooth, and level roads or pavements at the actual average battery charge.

Electric vehicle mileage ratings shall be based on a continuous run at the S.A.E. rated speed with one-half load over hard, smooth, and level roads or pavements.

THE MUD-SPLASHING QUESTION.—The chairman of the Eastern District Committee of Stirling County Council, at their February meeting, stated that he had brought the question of mud-splashing by motor vehicles to the notice of the County Councils Association, and that it was being considered by the Departmental Committee on Locomotives and Heavy Motor Cars. While awaiting the report of that committee, the surveyor has been authorised to experiment with a set of guards attached to a motor car. The guard comprises an iron ring fastened to the spokes of the wheel by clips. Attached to the ring is a circular rubber flap, which revolves with the wheel nearly on a level with the tread of the tire.

LONDON GENERAL OMNIBUS COMPANY.

At the annual meeting of the shareholders held on February 24, the Chairman (Mr. C. J. Cater Scott) stated that the report and accounts were the first issued since the agreement constituting the common fund was entered into under the powers of the London Electric Railway Companies Facilities Act, 1915. The parties to the agreement were the City and South London, Central London, London Electric and Metropolitan District Railway Companies, and their own company. For the year under review their proportion of the common fund was 40 per cent. The gross receipts amounted to £2,882,410, a decrease of £344,129 as compared with 1914. After making allowance for depreciation of leases, plant, machinery, etc., and reserve for contingencies and renewals, there was a balance of £271,519. The balance from last account was £64,547, and the interest, discounts, and dividends on investments, £50,440. The interest on the 4½ per cent. first debenture stock was £44,045, and on the 5 per cent. cumulative income debenture stock, £50,000. The amount credited to the 4½ per cent. first debenture sinking account was £10,954, and £10,000 had been written off preliminary and liquidation expenses. There had been a loss of £9,664 on realisation of investments through the general depreciation, while the conversion of consols into 4½ per cent. war loan stock resulted in a further loss of £6,513. The amount written off discount on issues of debenture stocks was £10,236. Those items totalled £141,413, leaving a balance of £245,093 carried to profit and loss account. For the half-year ended June 30, the directors declared an interim dividend, free of income-tax, on ordinary shares of 6 per cent., and it was recommended that a further dividend of 6 per cent., free of income-tax, be paid. The further dividend would absorb £114,661, leaving a balance of £23,237 to be carried forward. Those dividends compared with 16 per cent., free of income-tax, for the year 1914, and the carry-forward was reduced by £41,310. The serious depletion of the staff and the large number of omnibuses taken by the Government had placed additional responsibilities upon those who remained behind, and those responsibilities were increased by the darkness of the streets at night. The time had come when they could not maintain the present services with the men available. The management had therefore made arrangements for training women as conductors.

In their fourth annual report the directors state that an agreement had been entered into between the Omnibus Company and the several railway companies whereby the common fund authorised by the Act was established. For the year ended December 31 last the gross traffic receipts of the five companies were £4,924,245, the gross aggregate receipts being £5,481,144. The amount retained by the several companies for "revenue liabilities," as defined in the agreement, which include working expenses, prior charges, reserves, and other items specified in the agreement, was £5,029,778. The balance of £451,365 was credited to the common fund authorised under the Act. Under the terms of the agreement the company were entitled to 40 per cent. of this fund, and accordingly received £180,546. Plus £64,547 brought forward from last year, there was a total of £245,093 available for dividend on the ordinary shares. The company's gross receipts were £2,882,410, and the expenditure £2,412,142. After appropriating £198,747 for depreciation of leases, plant, machinery, furniture, etc., and reserve for contingencies and renewals, the balance at credit of revenue account was £271,519. With the balance from last year and the sums received from interest, discounts, and dividends on investments, the total balance was £386,507. From this amount £141,413 was deducted for interest on the three classes of stock and for preliminary and liquidation expenses, loss on realisation of investments, etc., leaving £245,093 at credit of profit and loss account. In July last an interim dividend of 6 per cent. was paid, which absorbed £107,194, leaving £137,898 available. The directors recommended the payment of a further dividend of 6 per cent. on the shares of the company, carrying forward £23,237. The total number of passengers carried by the five companies could not be given in this year's report, owing to the Metropolitan District Railway being under Government control. During the year £64,494 was expended on the purchase of land and the construction and equipment of new garages. The Minister of Munitions had made an order declaring certain of the garages and factories of the company to be controlled establishments. The revenue account showed general receipts (including traffic receipts, private hire, advertising, and sundries) totalling £2,882,410. Included on the expenditure side were the following items :—Drivers' and conductors' wages, £705,208 ; road expenses (including licences, superintendence, ticket service, omnibus lighting, fuel, lubrication, compensation and law charges, garage expenses), £621,572 ; maintenance expenses (rolling stock, tires, £918,381, premises, furniture, and fixtures, £17,069), £935,450 ; general expenses, £149,911 ; depreciation, £23,747 ; contingencies and renewals, £175,000.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 14.] LONDON, SATURDAY, MARCH 11, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

THE SOUTH INDIAN RAILWAY COMPANY, LIMITED,

Are prepared to receive Tenders for the supply of:
Quilon-Trivandrum Branch (Metre Gauge).
No. 1. 132 Pairs Steel Disc or Wrought Iron Spoke Wheels and Axles.
No. 2. 12 50ft. Bogie Carriage Underframes.
Specifications and Forms of Tender may be obtained at the Company's offices.
Tenders addressed to the Chairman and Directors of the South Indian Railway Co., Ltd., marked "Tender for Wheels and Axles," or as the case may be, must be left at the offices of the Company not later than one o'clock on Wednesday, March 15, 1916.
The Company is not bound to accept the lowest or any Tender.
A charge, which will not be returned, will be made of 20s. for each copy of specifications.
Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M. Inst. C.E., Consulting Engineer to the Company, 3, Victoria Street, S.W.

91, York Street,
Westminster, S.W.,
March 1, 1916.

COUNTY BOROUGH OF BLACKPOOL.

TRAMWAY UNIFORMS.

The Tramways and Electricity Committee invite Tenders for the supply of uniform clothing for the Traffic Staff.
Tender forms and full particulars may be obtained upon application to the undersigned.
Tenders in sealed envelopes endorsed "Tender for Uniform Clothing," and addressed to the Chairman, Tramways and Electricity Committee, West Caroline Street, Blackpool, to be received not later than March 22, 1916. The Corporation do not bind themselves to accept the lowest or any Tender.

CHARLES FURNESS,
Borough Electrical Engineer and Tramways General Manager.

General Offices,
West Caroline Street, Blackpool.
March 8, 1916.

WANTED.

Building, with approximately 15,000 square feet of floor space, required for light engineering work, London neighbourhood. Purchase or lease. Box No. 89, "The Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

CITY OF MANCHESTER.

SWITCHGEAR.

The Electricity Committee of the Manchester Corporation are prepared to receive Tenders for the supply, delivery and erection of 6,600 volt three-phase Switchgear at Stuart Street Station.
Specifications, drawings, and forms of Tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of one guinea, which amount will be refunded on receipt of a bona fide tender.
Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.
Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall, not later than 10 a.m. on Wednesday, the 22nd instant.
The Corporation do not bind themselves to accept the lowest or any Tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
March 6, 1916.

COUNTY OF LONDON.

The London County Council invites Tenders for the supply of Guernsey Granite Setts for use in the Tramways Department for a period of twelve calendar months from April 1, 1916.
Particulars, forms of Tender, etc., may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.
The person whose Tender is accepted will be bound by the contract to pay wages at rates not less and to observe hours of labour not greater than the rates and hours set out in the Council's list. Particulars of the Council's Standing Orders as to its conditions of tender and contract are given in every issue of the "London County Council Gazette."
No Tender received at the County Hall after 11 a.m. on Tuesday, March 21, 1916, will be considered.
The Council does not bind itself to accept any Tender.

JAMES BIRD,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.
March 4, 1916.

COUNTY OF LONDON.

The London County Council invites Tenders for the supply of Wood Paving Blocks for use in the Tramways Department for a period of twelve calendar months from April 1, 1916.
Particulars, form of Tender, etc., may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.
The person whose Tender is accepted will be bound by the contract to pay wages at rates not less and to observe hours of labour not greater than the rates and hours set out in the Council's list. Particulars of the Council's Standing Orders as to its conditions of tender and contract are given in every issue of the "London County Council Gazette."
No Tender received at the County Hall after 11 a.m. on Tuesday, March 21, 1916, will be considered.
The Council does not bind itself to accept any Tender.

JAMES BIRD,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.
March 4, 1916.

TRAMWAY CARS FOR DISPOSAL.

Four Single-Deck Cars, mounted on Brush Maximum Traction Trucks. Bodies are constructed with closed compartments each end, and open with cross benches in centre. Seating capacity, 40 passengers (20 inside and 20 outside). Gauge, 4 ft. 8½ ins. Each car complete with 2 D.K. 25a motors, brush H.D. 2 controllers, ready for immediate service. Price, £320 each at Depot.—Apply, The MANAGER, Middleton Electric Traction Co., Hilton Fold Lane, Middleton, Lancs.

Digitized by Google

POSITIONS VACANT.

PLATELAYER.

Platelayer required for Ipswich Corporation Tramways to work on repairs under Track Foreman. Permanency. Preference given to one who has had experience in dealing with bad rail joints. State age, whether married or single, whether ineligible for Military Service, wage required, together with full particulars of experience, to Manager.

LLANDUDNO ELECTRICITY WORKS.

Wanted, Engine Driver in Electricity Supply Station during eight-hour shift. Applicants must have had similar experience and be familiar with high-speed engines.

Applications to be forwarded to Electrical Engineer, Electricity Works, Llandudno, stating age and wages required, enclosing copies of testimonials and when appointment can be taken up.

Applicants eligible for the Army or on munition work will not be entertained.

NUNEATON CORPORATION.

ELECTRICITY WORKS.

The above Corporation have a vacancy for a Switchboard Attendant. Discharged soldier or sailor, or rejected man familiar in the least degree with electrical work. Progressive station. Salary according to ability.

Apply to Harold Hodges, Acting Electrical Engineer, Electricity Works, Coton Road, Nuneaton.

March, 8, 1916.

ENGINEER-IN-CHARGE.

Engineer-in-Charge required for period of the War. Salary £3 per week.—Apply to Mr. G. G. Bell, Hammersmith Borough Council, Electricity Department, 85, Fulham Palace Road, Hammersmith.

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.
Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD,
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 3488 Leeds. MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS' SUPERFINE PAINTS
and
EXTRA DURABLE VARNISHES
for
TRAMCARS.

DOCKERS' "HERMATOR" PAINTS AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

THE AUTOBUS

IN THE TRAMWAY WORLD.

Motor Traffic Section.

When "The Tramway and Railway World" was founded in 1892, motor traction was, of course, scarcely dreamt of, but the avowed object of the paper was to encourage all new methods that gave promise of usefulness.

In pursuance of that policy the progress of motor traction received early attention. Commenting on the historic motor parade to Brighton in 1896, "The Tramway and Railway World" predicted that

> "It would give a prodigious impulse to transport both by road and rail."

Within a decade this prophecy was abundantly fulfilled and so much space has been devoted to the new industry that in 1906 a special

MOTOR TRAFFIC SECTION

was added. Every illustrated issue thus contains a section devoted especially to motor cars for Public Service, and includes articles on current topics, illustrated descriptions of new types of vehicles and accessories, and the latest news.

Public Service Motor Cars.

The importance of this section will be gathered from the fact that an increasing number of the leading municipal authorities, railway and transport companies, now own and operate large fleets of motor vehicles of various types, including omnibuses, char-a-bancs, motor lorries for the transport of goods, parcel delivery vans, tower wagons, motor street sweepers, etc.

Digitized by Google

THE

Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MARCH 11th, 1916.

GROWTH OF PUBLIC MOTOR SERVICES.

Two events have this week emphasised the growth of public motor services in this country. In another column an abridged report of the remarks of Sir George White at the annual meeting of the Bristol Tramways and Carriage Company gives some indication of the progress of the motor department of that company. The business is conducted in half a dozen towns, and its gross receipts for the year 1915 increased by over 23 per cent. There is now scarcely a district in the kingdom that is not served by a public or private motor service. In the provision of those facilities both municipal and company tramway undertakings have played a leading part, as the columns of our illustrated issues have shown since 1896, when, in commenting on the motor run to Brighton held under the auspices of the Royal Automobile Club, we predicted that "it would give a prodigious impulse to transport both by road and rail." Within a decade this prophecy was fulfilled, and now at the end of a second decade we have this week received a copy of the first annual issue of "The Motor Transport Year Book and Directory," published by the Electrical Press, Ltd. The publication will be welcomed in the office of every traction undertaking, and the introductory volume will have an historical interest in the years to come, not only on account of the mass of information to be found therein but also because it affords testimony to the indefatigable industry that has been shown in compiling it during difficulties entailed by the peculiar conditions created by the war. The Year Book is comprised of three sections. First, there is a survey of the laws relating to public service vehicles, followed by geographical and alphabetical lists of motor transport undertakings, and a complete list of railless trolley installations. Section 2 comprises a list of manufacturing and miscellaneous companies allied to the industry, and Section 3 provides a valuable directory of two thousand officials connected with motor transport undertakings and manufacturing companies. The 300 pages of the first issue are likely to be doubled and trebled in the next year or two, for in compiling the present issue there was no possibility of displaying in detail, by means of comparative figures, the wonderful progress that the motor transport business has displayed. The pages show that of the 350 public service undertakings, 270 in operation have an estimated capital of about £7,500,000, and a total service of 6,300 vehicles. These figures would have been much larger had not the war intervened to deplete existing services, and to prevent the formation of new enterprises. An interesting item of the Year Book is an article by Mr. T. C. Elder on "Public Service Motor Policy in 1916." This should afford material for reflection by all who are concerned in passenger transport. The author discusses the question whether the omnibus chassis may not have to give place to vehicles of smaller capacity and higher speed as the result of "jitney" competition from vehicles running on pneumatic tires. Where the provision of transit arrangements is in the hands of public authorities, there need be no fear of such unjust rivalry being permitted, but it is already in force in several places where omnibuses are run by tramway companies. Speed costs money, and it remains to be seen whether the development succeeds or fails, as it has done in a number of American districts. Another aspect of the matter not mentioned in the Year Book is the experiment with pneumatic tires for omnibuses in the United States.

TRAMWAYS UNDER THE MUNITIONS ACT.

By sixty-two votes to seventeen Glasgow Corporation have agreed to apply to the Minister of Munitions for the inclusion of the Tramways, Electricity, Gas and Water Departments under the Munitions of War Act. Councillor Wheatley, who moved that the minute be taken back, said the only argument brought forward in favour of including the Tramways Department was that the manager found it difficult to hold his men. Mr. Dalrymple had stated in committee that representatives of munition-making firms were waiting at the gates to induce the tramway employees to go to make munitions. Councillor Montgomery, chairman of the Tramways Committee, replied that the tramways conveyed millions of passengers to the munitions works, and it was not too much to say that the munitions works could not be carried on unless the tramways carried the passengers to and from the works.—Replying to a councillor's assertion that a notice had been put up in the tramway works stating that as the men were within a controlled establishment they could not leave without a clearance certificate, the Deputy Town Clerk said the resolution only bound the Council to make application, and it was only when that application was disposed of by the Minister of Munitions that it could take effect.

REGULATION OF PASSENGERS.

On the subject of overcrowding, Mr. J. W. Hame, general manager, York Corporation Tramways, has reported that it is impossible to deal adequately with the workpeople's traffic without providing a larger number of cars, out of proportion to the size of the undertaking. The only way in which the overcrowding can be satisfactorily dealt with is by insisting on the enforcement of the by-laws, and particularly No. 18, which provides as follows:—"No person shall hold or hang on by or to any part of any car, or travel therein or thereon, otherwise than on a seat provided for passengers, except in the interior of the car with the consent of the conductor." Mr. Hame proposes to limit the number of passengers to twenty-two inside and six standing, and twenty-six seated on the top. This, he states, should enable the conductor to get through with the collection of fares. In dealing with the Haxby-road route, the manager is arranging for barriers to be placed, so that passengers must form in queues. Those who have taken a return tickets will be allowed in the barriers first. The Tramways Committee have approved of the proposals.

TRAFFIC DURING THE AIR RAID.

The arrangement devised for securing darkness and quietude in the West Riding of Yorkshire during air raids worked admirably last Sunday night. The plan was formulated at a conference held at Leeds, when the original scheme for the use of factory buzzers to give warning was abandoned. In the case of both the electricity and gas supplies the alarm was given by the light being reduced and raised again three times. Then after a brief interval to allow users to light candles, the electricity supply was cut off. Taking Bradford as an instance, the effect was to bring tramway traffic to a stop as well as to extinguish all electric lights, the cars remaining in the streets until the power supply was restored several hours later. Railway traffic was also brought to a standstill.

Digitized by Google

ERITH OMNIBUS SCHEME.

LONDON COUNTY COUNCIL'S SUGGESTIONS AS TO ROAD UPKEEP AND COMPETITION.

Erith Urban District Council have applied to the Local Government Board for a provisional order extending their Tramways and Improvement Act, 1903, so as to authorise them to run motor omnibuses both within and without the urban district of Erith. The Parliamentary Committee of the London County Council, at the meeting of that authority on Tuesday, reported that the application was of interest to the Council because it is proposed to obtain power to run the omnibuses throughout the Metropolitan borough of Woolwich. Erith Council state that the omnibuses will be a great convenience to persons residing in Erith and Woolwich who are engaged in the manufacture of munitions. In the opinion of the Parliamentary Committee the proposal introduces a novel principle and gives rise to some difficult questions. No local authority at present possesses power to run motor omnibuses in the County of London, and they thought the Council would probably view with some apprehension the granting of powers to a local authority outside the county to run omnibuses inside the county, particularly when the vehicles, which will be provided out of public money, will run along some of the Council's tramway routes, on the construction of which a large sum of money has been expended, and will thus compete with the tramways.

The report went on to state that the Highways Committee have conferred with representatives of the Urban Council upon the subject and were of opinion that unless the proposal is to be regarded simply as an emergency measure to operate only during the war, satisfactory arrangements should be made with regard to the contributions by the Urban Council towards maintenance of the roads over which the omnibuses run, and towards the cost of street improvements necessitated partly by the omnibus traffic; and that the Urban Council should give an undertaking not to oppose any application that may be made by the County Council for authority to run tramcars or motor omnibuses in Erith. With regard to the cost of street improvements necessitated partly by omnibus traffic, the Highways Committee expressed the opinion that the Urban Council should contribute a proportion not exceeding one-third of the net cost of such improvement. An arrangement has been come to between the Woolwich Council and the Urban Council under which the latter will not run omnibuses in Woolwich until the consent of the Borough Council has been obtained, and such consent will only be given on condition that the Urban Council agree to contribute to the maintenance of the roads used by the omnibuses.

With regard to the amount of the contribution that should be paid to the County Council or the Borough Council in respect of road maintenance, the Parliamentary Committee pointed out that in the Middlesex County Council (Great West Road and Finance) Act, 1914, provision was made for the payment of $\frac{3}{8}d.$ an omnibus mile in respect of omnibuses using the road. The Parliamentary Committee, in view of the fact that the Local Government Board might shortly hold an inquiry into the application, concurred with the views of the Highways Committee, and recommended:—

(*a*) That, in the opinion of the Council, the Erith Urban Council Provisional Order to enable the Council to run motor omnibuses in the Borough of Woolwich, should, if granted, provide—

(1) That the Urban Council shall contribute a sufficient amount towards the cost of maintaining the carriage way of roads used by the omnibuses.

(2) That the Urban Council shall contribute towards the net cost of any street improvement which may be necessitated partly by omnibus traffic a sum not exceeding one-third of the net cost of such improvement.

(3) That no changes shall be made in the services or fares on the Council's tramway routes, except after discussion between the officers of the Council and of the District Council.

(4) That there shall be some financial adjustment as between the Council's tramway undertaking and the omnibus undertaking in respect of competitive routes.

(*b*) That the Erith Urban Council be asked to give an undertaking that, in the event of the Provisional Order referred to in the foregoing resolution (*a*) being granted, they will not oppose any application that may be made by the County Council for authority to extend their tramways system or to run motor omnibuses.

At the meeting of the County Council on Tuesday considerable opposition was extended to the recommendation of the Parliamentary Committee with respect to the contribution by Erith Urban Council to the cost of maintaining the carriageways within the borough of Woolwich. Eventually, the recommendation (*a*) (1) was varied by the insertion of the words "to the maintaining authorities" after the word "contribute," and (*a*) (2) by substituting the words "to an extent" for the words "a sum." In that form the report was received and adopted.

L.C.C. TRAMWAY MATTERS.

A meeting of the London County Council was held on Tuesday last, when the following tramway business was transacted:—

STEEL TIRES.

The Highways Committee reported that they had accepted the tender of H. Bessemer and Company, Ltd., for 500 driving-wheel tires and 250 pony-wheel tires, at £38 10*s.* a ton, less two and a half per cent. discount for the driving-wheel tires, and £55 10*s.* a ton, less two and a half per cent. discount, for the pony-wheel tires. Only one other tender was received, viz., that of Cammell Laird and Company, Ltd., the prices being the same except that no discount was offered.

GREENWICH GENERATING STAFF.

A petition has been received from certain employees in Greenwich generating station asking (1) that the rate of pay of leading stokers and assistant engine attendants be increased by fifteen per cent.; (2) that the rate of pay of senior stokers be increased by ten per cent.; (3) that all men employed at power stations, not affected by custom or existing agreements, be paid for overtime at the rate of time and a quarter for the first two hours, time and a half thereafter up to starting time the next day, and double time for Sunday; and (4) that work done on Christmas Day and Good Friday be paid at the rate of double time. The petitioners have asked that in the event of their requests not being acceded to, the petition may be referred to the appropriate conciliation board. The Highways Committee were of opinion that in accordance with the terms of the conciliation board's scheme, these employees were not entitled to have their wages reconsidered by the conciliation board until after June 4, 1916, *i.e.*, twelve months from the date of the award. The part of the petition regarding overtime relates to employees not affected by existing agreements, and the Committee recommended that this request should be referred to the Electrical Conciliation Board.

VOTES OF THANKS.

The Highways Committee reported that they had passed cordial votes of thanks to their chairman, Mr. G. H. Hume, and the vice-chairman, Captain Theodore Prestige, for their services during the past year.

ELECTRIC VEHICLE COMMITTEE.

At the last monthly meeting of the Electric Vehicle Committee, Mr. A. C. Cramb, president of the Incorporated Municipal Electrical Association presiding, a letter was read from Mr. A. J. Marshall, secretary of the Electric Vehicle Association of America, congratulating the committee upon the very tangible progress that they had made in the introduction of electric vehicles.

The Accumulator Manufacturers' section of the British Electrical and Allied Manufacturers' Association, having been asked to consider the possibility of further standardisation of lead-acid accumulators for electric vehicles, particularly in regard to rating and the overall sizes of cells, had replied stating that they were prepared to agree to the standard sizes and rating as set forth in an accompanying document. This is considered satisfactory by the committee as meeting present requirements. These, as well as other matters in connection with lead-acid accumulators that have, with the co-operation and assistance of the manufacturers, been standardised, will be known as the E.V.C. standards, but it is hoped that the British Engineering Standards Committee may adopt them as British standards. Purchasers of electric vehicles, when lead-acid cells are intended to be used, are urged to insist that in rating and construction they should be in accordance with the E.V.C. standards.

Since October subscriptions amounting to £56 14*s.* for carrying on the work have been received from municipalities, electric supply companies, manufacturers, and others.

Allusion was made to the difficulties of delay or exorbitant prices experienced in a few districts bordering upon the London area in getting boosting charges for electric vehicles. The committee's standard tariff is 1*d.* per unit for "off-peak" charging, with a minimum of 2*s.* per charge (24 units at 1*d.*), and the committee appeal to all central station engineers to adopt this rate. It is not necessary to put down any expensive motor-generator plant or switchgear; all that is required is a permanent connection from the switchboard bus bars through a d.p. switch and fuses, or a maximum overload circuit-breaker, through an adjustable water resistance to a British standard charging plug. If there is a booster set or an exciter in the station, giving about 120 volts, which can be used for the purpose when required, so much the better.

The committee have accepted an invitation by the Society of Motor Manufacturers and Traders to nominate a representative to sit upon the Tire and Research Committee appointed by the Society to investigate all technical matters relating to rubber tires.

WOMEN AS TRAMWAY EMPLOYEES.

FEMALE DRIVERS RECOMMENDED AT GLASGOW.

Glasgow Corporation Tramways Committee have agreed to recommend that the general manager be authorised to maintain the present service of cars and if necessary, to employ women as drivers. The experiment tried with thirty-three women as drivers has been found satisfactory, and the recommendation will come before the Town Council at the meeting on the 10th instant. The women car drivers are to be employed on the same terms and conditions as motormen, their wages being 29*s.* per week. There are now 1,200 women conductors on the Glasgow cars.

Women are discharging the work of conductors on the London County Council cars in a very efficient manner, thanks to the thorough training that they receive. They are to be seen in pairs on the double-deck bogie cars during the rush hours, while at the slack periods one woman has no difficulty in managing the work of a car. They also take the heavy point lever, run ahead of a car on the slush covered roads and move the points. On the Metropolitan Electric Tramways women are working as stationary point shifters.

Mr. C. J. Spencer, general manager, Bradford Corporation Tramways, has reported that the twenty women engaged as conductors have come through their trial most successfully. There had been no complaint and no accidents, while their cash mistakes were fewer than those made by men. More women are to be trained as conductors.

A young woman conductor on the Bexley Tramways was fatally injured at the depot by being crushed between two cars while she was adjusting the trolley. It was dark at the spot on account of the lighting regulations. The motorman of the car that was shunting looked to see if the road was clear before moving, but failed to see the other car because all the lights were out. At the inquest the jury returned a verdict of accidental death.

The number of female conductors at Manchester is not far short of three hundred.

Digitized by Google

MISCELLANEOUS NEWS AND NOTES.

New Tramway in Madrid.—A concession has been granted to the Sociedad Tranvia del Este de Madrid for the construction and working of an electric tramway in the Monte del Pardo district.

Clayton-le-Moors Light Railway.—The Clayton-le-Moors Light Railway (Extension of Time) Order, 1915, has been issued by the Board of Trade, extending the time for the completion to June, 1919

An Australian Extension.—Tenders will be received up to 11 a.m. on April 26 by the Victorian Railway Commissioners for the supply and delivery of electrical equipment and accessories for the sub-station of the Sandringham-Black Rock tramway.

Tramcars for Toronto.—Up to noon on March 14 tenders will be received by the chairman of the Board of Control, City Hall, Toronto, for the supply and delivery of a single truck tramcar, a car body, and equipment for two single trucks.

Dublin Tramways and Railway Electrification.—A suggestion was made by a shareholder at the annual meeting of the Dublin and South-Eastern Railway, that negotiations should be opened with the Dublin United Tramways Company with a view to the electrification of the railway between Dublin and Bray.

Effect of War on Tramway Car Advertising.—At a recent meeting of the Tramways Committee of the Sunderland Corporation it was reported that only three tenders had been received for advertising on the cars and tickets. The prices offered were considered to be too low to make it worth while accepting any of them, and it was decided to allow the present contract to expire.

Controlled Establishments.—The Minister of Munitions announced on March 6 that he had made an order under Section 4 of the Munitions of War Act, 1915, declaring 218 additional establishments to be controlled establishments under the Act as from March, 1916. A total of 3,052 establishments have now been declared as controlled under the Act from the date of the first Order, July 12, 1915.

To Prevent Speculation in Metals.—Under the Defence of the Realm Act, a regulation has been made at the instance of the Ministry of Munitions to stop speculation in metals generally, but not to restrict legitimate trading. Transactions will not be permitted, except under special licence from the Ministry of Munitions, in the following:—Scrap from high-speed steel, scrap from copper, scrap from brass.

Increased Charges for Power.—Leeds electricity undertaking is the latest to increase the charge for light and power owing to the higher cost of coal, etc. From April 1 the price is to be advanced by ten per cent. for one year, when it will be reviewed. Liverpool has increased prices all round by twelve and a half per cent., Manchester for light ten per cent., and power fifteen per cent., and Glasgow fifteen per cent.

Halfpenny Fares Discontinued at Leith.—On the recommendation of the Tramways Committee, the Leith Town Council have decided to abolish as from March 15 the halfpenny fares, also the workmen's fares in the middle of the day, and soldiers' and sailors' privileges. The Town Council have instructed the Tramways Committee to appoint a sub-committee to consider the whole question of tramway finance and to report thereon.

A Petrol Supply Scheme.—In connection with the heavy consumption and supply of petrol, the Committee of the Royal Automobile Club have offered to submit a scheme to the Government. It is being drawn up with a view to secure not only a better and more equitable distribution, but also to put an end to the waste now going on. As all the petrol used is imported, any saving that can be effected helps the Chancellor of the Exchequer in his campaign for economy, and for maintaining the rate of exchange.

American Competition.—The Public Services Committee of Auckland Corporation recently informed the electrical engineer that they would consider only British-made goods in response to tenders for the supply of transformers. The engineer, in reporting on the tenders, said he could not advise acceptance of English tenders unless the firms promised delivery at their own works in twelve weeks. He favoured an American tenderer, who offered high-class material and a reasonable time of delivery. The matter was left in the hands of the Mayor to act after communicating by cable with the British firms.

Industrial Progress.—The Path Publishing Company have in preparation a book by Mr. D. N. Dunlop, A.I.E.E., entitled "British Destiny—the Principles of Progress." The author is secretary of the British Electrical and Allied Manufacturers' Association, and his discussion of the foundations of progress will be widely read by all who are interested in the welfare of the Empire. He shows the philosophical basis of voluntary co-operation and its possible combination with the British policy of individualism, while preserving the full value of the latter. A scheme for national industrial federation is outlined.

Dundee Arbitration.—Dundee Council have received from the Town Clerk a statement of the expenses to be paid by the Corporation in connection with the arbitration in regard to taking over a mile of line from the Suburban Tramways Company. Included in the company's expenses was the sum of £524 charged by Mr. S. Sellon, their consulting engineer. On being taxed it was reduced to £275. The company's total charges amounted to £1,465, reduced when taxed to £919. The City's expenses were £2,543, including £398 paid to Mr. J. B. Hamilton. Under the award the Corporation will pay £9,255 for the tramway, as against £14,500 claimed by the company.

Failure of Halfpenny Fares at Erith.—In reply to a motion that halfpenny fares be instituted and that two 1½d. stages be reduced to a penny to enable the tramcars "to compete with the omnibuses," Councillor G. C. Humphreys, chairman of the Tramways and Electricity Committee, stated that some time ago the Council experimented with halfpenny stages, and lost in three months £110, although they carried a larger number of passengers, involving the use of extra cars and labour. It was not reasonable to reduce 1½d. fares to 1d. when the average cost of materials had increased by 40 per cent. At the present time the receipts were up on last year's figures for the same period.

Leeds Employees' Requests.—On the recommendation of the General Purposes Committee, Leeds Corporation have decided not to grant the increase of wages applied for by the tramway employees, or any increase of the war bonus except in special cases. For seventh day duty payment is to be at overtime rate for time worked in excess of normal rota duty. The union's application for alteration of the terms of employment of women conductors has been refused. The Corporation are paying over £40,000 a year to dependents of enlisted men. This sum nearly equals a 5d. rate, and it will be added to for the dependents of employees who have enlisted during the last months of voluntary recruiting.

The Demand for a Ministry of Commerce.—A deputation representing the business interests of the United Kingdom waited on the Prime Minister on March 7 and suggested the establishment of a Ministry of Commerce and improved commercial relations between the Mother Country, the Dominions, and the Allies. Mr. Asquith, in reply, said that the altered economic conditions produced by the war might involve the necessity, or desirability, of entrusting commercial relations to a single Department. Representatives of the Dominions would be consulted before the coming economic conference of the Allies and, the Government hoped to issue a Peace Book, which would help the commercial and other interests of the country to meet the altered trade conditions after the war.

Industrial Development.—A new departure was made by the Institution of Civil Engineers on March 7 by inviting Mr. Harold Cox to give an address on "Industrial Development." Mr. Cox urged that what we are doing now for the purpose of killing our antagonists might be turned into an effective means of preserving our people, their friends, families, and descendants in peace and comfort. As the Council put it on their invitation cards: "The present time calls for some earnest attention on the part of engineers to the economic issues which, after the war, must influence profoundly the future of engineering as well as the industrial and commercial enterprises that are vital to its progress both in this country and abroad." Sir John Wolfe Wolfe Barry proposed, and Sir Archibald Denny seconded a hearty vote of thanks to Mr. Cox.

International Engineering Congress.—The Committee of Management, International Engineering Congress, 1915, announces that the volume on Mechanical Engineering is ready for distribution and the members who have subscribed to this volume will soon receive it. The other volumes will be issued as rapidly as possible. Owing to the large amount of material to be reprinted, and the thousands of copies to be bound, the work cannot be carried on with greater speed. However, it is hoped that within two months the entire set will be completed. Members who did not send in their final selections may be disappointed in not securing all the volumes they might have had in mind, and at this date the Committee has decided to close the lists for certain volumes which have been sent to the press. It may be possible to supply members who would apply at this late hour with copies of volumes that have not gone to press. Applications should be addressed to Mr. W. A. Cattell, Secretary, 425, Foxcroft Building, San Francisco, California, U.S.A.

The Stoppage at Birmingham.—A suggestion was made at the meeting of the Council on March 7 that, in the event of the Electricity department again having to cut off the supply of power to the tramways, notice should be given to the public. Unless that was done there would be a grievance arising from the passenger who paid his fare and found the journey was not accomplished; secondly, the disability of not knowing how long the stoppage would last. Councillor Harrison Barrow, chairman of the Tramways Committee, remarked that he knew of no other town that had had to cut off its tramway power, and he could not help thinking that arrangements could be made to get an adequate supply of coal. Alderman Jephcott, chairman of the Electricity Committee, replied that at the chief station coal could be received only by canal. At the new station arrangements would become operative that day by which coal would come by railway as well as by canal. It could then be transferred to the canal and given to the other two stations. Steps were taken to notify the tramways department every time the electric engineer anticipated a shortage of power.

New York City Railway Electrification.—The State of New York and the New York Central Railroad have arrived at an agreement concerning the reconstruction of the company's tracks on the Hudson River side of the city, and the elimination of tracks at street levels along Eleventh Avenue. The tracks will be electrified, and this, with other improvements, will cost about ten million pounds. It is estimated that six years will be required to complete the work. Electric operation has been decided on primarily because the tracks run past a residential and park district, from which numerous complaints have come, owing to the use of steam locomotives. Much of the reconstructed line will be in tunnels, which necessitates the abandonment of the steam locomotives. From Spuyten Duyvil to St. John's Park, a distance of twelve miles, the tracks at present run on grade, sometimes skirting the river bank, sometimes occupying city streets, as in Eleventh Avenue. The plan now adopted is to get the tracks entirely out of the way, in some places depressing and covering them, and in others running on viaducts. Mr. E. P. Goodrich, consulting engineer to the borough president of Manhattan; Mr. C. W. Staniford, chief engineer of the department of docks and ferries, and Mr. J. P. Sullivan, engineer of the bureau of contract supervision of the Board of Estimate and Apportionment, are acting as consulting engineers to the Board of Estimate and Apportionment. These engineers, in conjunction with the New York Central Railroad, represented by Mr. G. A. Harwood, chief engineer of electric zone improvements, and Mr. H. D. Jewett, designing engineer, have been responsible for the plans.

Digitized by Google

PERSONAL.

Mr. H. J. Nisbett, manager and engineer, Torquay Tramways Company, and the staff were commended for their work during the past year by Mr. W. B. Cownie, who presided at the annual meeting. Mr. Nisbett was described as a man who was never beaten, who, in addition to carrying on the tramway traffic under great difficulties, had started important work for the Government.

Mr. Pakenham W. Beatty has resigned the position of chief engineer to the Lacroze Tramway Company of Buenos Ayres, which he has held since June, 1913, in order to take up the position of chief engineer of the Buenos Ayres Underground Railway. This undertaking is owned by the Anglo-Argentine Tramways Company of Buenos Ayres.

Mr. Charles Challenger, manager of Bristol Tramways and Carriage Company, with the assistance of those men who are ineligible for military service, is largely carrying on the beneficent Red Cross ambulance work in the district of which the city is a centre of great activity. At the company's annual meeting Sir George White, the chairman, referred to the able and patriotic leadership of Mr. Challenger in this work.

Mr. J. W. Dugdale has resigned his position of general manager and engineer of Oldham Corporation Tramways. Some time ago he met with an accident at Sheffield which has affected his health. This reason, combined with the great difficulty now encountered in carrying on the tramways owing to the loss of men for military and munition service, led him to place his resignation in the hands of the Tramways Committee. They have accepted it with regret. The shortage of skilled hands in the car shop and in the running staff in a district of severe gradients has for many months placed a great burden upon Mr. Dugdale. To add to those difficulties he has just lost his confidential clerk to the army, while light of the dozen clerks in the office are also with the colours. These experiences are typical of the difficulties under which tramway services are now being carried on throughout the country, and only a manager of iron constitution can bear the strain. During the year he has been at Oldham, Mr. Dugdale has greatly improved the position of the tramways, and it is to be hoped that after a holiday he will be able to resume his professional duties.

Second Lieutenant A. F. Goodfellow, 3rd Connaught Rangers, who was killed in France on February 20, was assistant engineer of the Burma Railways. While a student at the Central Technical College, South Kensington, he became Siemens medallist and David Salomons scholar, and obtained diplomas in electrical, civil and mechanical engineering.

CONTRACTS AND ORDERS.

Croydon Corporation Tramways have accepted the tender of Siemens Brothers Dynamo Works, Ltd., for the supply of Wotan, Tantalum and carbon filament lamps for the ensuing year.

Omnibus Chassis for Manchester.—The Tramways Committee have placed a contract with Daimler and Company, Ltd., for four motor omnibus chassis.

Glasgow and Electric Refuse Wagons.—Before submitting a proposal for the use of electric tipping wagons for refuse collection, the Cleansing Committee propose to visit Birmingham, Sheffield, and Dover in order to inspect electric vehicles in use in those places.

Glasgow Tramways Committee have placed orders with John Stewart and Co., Ltd., for galvanised steel wire; St. Helens Cable Co. Ltd., cable; Messrs. Stewart and Lloyds, Ltd., tubes for canopy rods; and the British Insulated and Helsby Cables, Ltd., three-core cable, ozone-proof cables, and asbestos-covered wire.

Salford Electricity Committee have placed a contract with Andrew Knowles and Sons, Ltd., Pendlebury, for supply of 500 tons of Trencherbone slack, 16*s.* per ton, plus 8*d.* per ton for canal dues and hire of boats, making a total cost, delivered at the electricity station, of 16*s.* 8*d.* per ton.

Hackney Council have been recommended by the Electricity Committee to accept the following tenders:—Hart Accumulator Co., Ltd., battery, £250 17*s.*; Electro-motors, Ltd., charging booster, £53 17*s.*; Nalder Bros. & Thompson, Ltd., switchgear, £98; Hart Accumulator Co., Ltd., for maintenance of battery supplied by them for ten years from date of first charge, £17 10*s.* per annum.

Liverpool Tramways Committee have allotted contracts to F. W. Rowlands and Co., for steel gears and pinions; and to the Vacuum Oil Co., and C. C. Wakefield and Co., for lubricating oils and greases. Tenders for iron castings have been accepted from the Moston Malleable Castings Co., National Rail and Tramway Appliances Co., Interchangeable Brake Block Co., J. Allan, Sen., and Son, and J. Needham and Sons.

Manchester Council have approved of the following contracts:—Tramways Department:—J. Mackie and Sons, block tin; Electricity Department:—Strachan and Henshaw, Ltd., one Telepher ash-handling plant; W. T. Glover and Company, Ltd., Chas. Macintosh and Co., Ltd., British Insulated and Helsby Cables, Ltd., supplies of cable; Newton, Chambers and Co., Ltd., hot-well tank and piping; British Westinghouse Electric and Manufacturing Co., sub-contractors for a 15,000 kw. alternator.

Salford Tramways Committee have recommended acceptance of the following tenders:—Supply of uniform clothing, etc., for tramway inspectors, motormen and conductors, for twelve months: Briggs, Jones and Gibson, Ltd., Manchester, uniform clothing, winter caps and extra buttons, etc., approximate value £3,408 20*s.* 3*d.*; D. Moseley and Sons, Ltd., Manchester, macintoshes and cap covers, £848 19*s.* 2*d.*; J. E. and F. Collier, Salford, leggings, cash bags, etc., £61 11*s.* 3*d.*

FINANCIAL REPORTS AND MEETINGS.

Tramways Light and Power Company.—The report for 1915 states that the receipts, including £1,712 brought in, amount to £32,213, and after providing for administration, loan and debenture interest, the profit is £19,324. The directors propose a dividend on preference shares for year of 6 per cent. less tax, and carry forward £3,348.

Jarrow and District Electric Traction Company.—During the past year the revenue totalled £8,855, an increase of £986. After meeting expenditure, debenture interest, and placing £800 to renewals, the balance available was £2,911, plus £1,026 brought forward. The directors have declared a dividend of four per cent. on the ordinary shares, while £900 has been placed to reserve, and £1,040 carried forward.

L.C.C. Tramway Receipts.—The tramway receipts from April 1, 1915, to February 23, 1916 (forty-seven weeks) were £2,086,074, a decrease of £6,484 as compared with the corresponding period of last year. For the two weeks ended February 23, the number of passengers was 21,162,720, a decrease of 476,488 over the corresponding period of 1915, while the receipts were £88,976, a decrease of £1,968. The route mileage worked was 141.67 miles.

Aberdeen Suburban Tramways Company.—The directors' report for the half-year ended December 31 last, states that the profit earned amounts to £1,438, making, with the sum carried forward from last half-year's accounts, a balance of £2,155 at the credit of the profit and loss account. The profit and loss account includes £3,810 brought forward per last accounts, less appropriations for renewal and depreciation account, dividend account, and directors' fees £3,093, leaving £716. To this has to be added £1,438 as the profit for the half-year ended July 31 last, making a total of £2,155. The assets include motor omnibuses valued at £2,825.

Metropolitan Electric Tramways.—The report for the year ended December 31, 1915, shows that the revenue amounted to £513,561. After adding the balance brought forward from 1914 and deducting all expenses chargeable to revenue, including a provision of £22,715, for reconstruction and renewals, there remains a balance of £44,275 which the directors propose to appropriate as follows:—Reserve account, £13,000; dividend on preference shares, £25,000; one per cent. dividend on the ordinary shares, £4,743; carried forward, £1,532. Alluding to the strike of the company's employees in May last, the directors record that this caused an almost entire stoppage of the car services for a period of thirteen days, including the Whitsuntide holidays. The loss in traffic receipts amounted to £16,000. The wages bill for the present year will show a material increase owing to further concessions granted to the staff in December last. The mileage open is 56·25, and the company have 312 cars in stock. The number of passengers carried was 89,656,054 as compared with 93,325,170 in the previous year, and the car miles run amounted to 9,686,525 as compared with 11,479,592. The average receipts per passenger were slightly higher at 1.23*d.*

Torquay Tramways Company.—The report for the year ended December 31 last showed a profit of £13,691, and after deducting debenture interest and allowance to dependents of employees who had joined the colours, there remained a balance of £6,510. To this has to be added £897 carried forward at December 31, 1914. The directors recommended that the total balance of £7,407 be dealt with as follows:—Reserve and renewals account, £2,500 (bringing this account up to £13,000), depreciation on furniture, fittings, plant and tools, £93, dividend of 3¼ per cent. on ordinary shares £3,900, carry forward £914. For the previous year the dividend was also 3¼ per cent. Mr. W. B. Cownie, managing director, who presided at the annual meeting, expressed regret that Mr. L. B. Schlesinger, the chairman of the company, was prevented by illness from attending. The traffic revenue afforded a good testimony to the stability of the undertaking, notwithstanding the withdrawal of all railway facilities for excursion traffic. The receipts for the present year, up to and including Feb. 9, showed an increase of £253. Prior to the outbreak of the war the directors placed an order for two motor omnibuses to act as feeders, particularly during the summer months, when they could have earned a good profit. Owing to non-delivery the order was cancelled, and it was unlikely that the board would consider the matter again before the war was over. The Corporation had announced their intention of charging an extra one farthing per unit for power, and should the price awarded by an arbitrator materially affect their costs the directors would have to rearrange the services and stages. The total operating cost per car mile was 6.09*d.* as compared with 6.36*d.* for 1914.

(*Continued on page* 232.)

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Mar. 9.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	64½	67
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	75/-	81/7½
4%	4%	Do. 4% Deb. ...	100	91	72½	72½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	74¾
5%	5%	Do. 5% Deb. ...	100	96	77½	77½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	19/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92½	92½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10	10
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97	97
$½	$½	Brazilian Trac. & Power Ord....	$100	66	50½	50½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	89¾xd	90
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 7/16	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	39	35½
5%	5%	Do. 5% Cum. Pref.	100	103	50¾	53¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	64½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	73½	73½
70/-	70/-*	Do. 7% Pref.	100	55½	46	45½
—	—	Do. 6% Pref. Ord.	100	17½	15½	15½
—	—	Do. Def. Ord.	100	11	10½	10½
5%	5%	Do. 5% Deb.	100	92	81½	82¾
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	68¾	68
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87½	87½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6 5/32	6/0.9
1/3	1/3	City of B.A. Trams.	5	5¾	92/6xd	92/6xd
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	86½	86
6/-	6/-	Dublin United Trys 6% Pref.	10	12	11 3/16	11 3/16
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	77	77
—	—	La Plata Trams. Ord.	1	¾	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	10 1/16xd	10 1/16xd
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½xd	9/10½xd
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/64	2/3	2/3
6d.‡	6d.	Do. 5% Pref.	1	9/10	9/-	9/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	55½	55½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	80	80
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	51	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	74	74
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78¾	78½
$1¾	$1¾	Mexico Trams. Common ...	$100	70	33	42
5%	5%	Do. 1 Mt. 5% G.B.	—	84	35	39¾
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/2*	1/2⅜*	National Steam Car	1	15/32	11/10½	11/3
9¾d.*	9¾d.*	New General Traction	1	½	7/9	7/9
1/2⅜	6d.	Northern Gen. Trans. Ord. ...	1	21/64	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4½	60/-	59/8
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	13/32	9/6	10/1½
8d.	10d.	Provincial Trams. Ord.	1	⅝	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	89	88½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	73¾	74
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	89
5%	5%	Do. 5% Perp. Deb.	100	99½	77½xd	77½xd
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94xd	94xd
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76½	76½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Increase or Dec.
Anglo-Argentine	Mar. 4	£51,890	£60,023	9	£455,264 +	£467
Auckland (28 days)	Jan. 14	22,164	22,868	28	148,708 +	1,612
Ballarat and Bendigo ...	Jan. 2	4,439	4,438	40	32,932 —	2,772
Brazilian Traction Mlrs.	Dec.	6,010 490	6,527,000	52	77,113,110 +	3,761,632
Brisbane	Jan.	29,620	32,280	4	32,280 +	2,660
British Columbia $	Dec.	674,063	603,667	26	3,240,146 —	758,753
Buenos Aires Lacroze ...	Feb.	38,877	39,137	34	330,663 —	4,480
Burmah Tramway ... Rs.	Mar. 4	3,344	3,487	31	... +	6,801
Calcutta Rs.	„ 4	56,894	70,956	9	623,907 +	41,635
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias..	Feb.	1,822	1,585	9	4,426 +	1,700
Cordoba	Dec.	12,091	13,025	34	124,148 +	4,718
East India	Feb.	1,649	1,863	30	14,394 +	864
Hong Kong $	Jan. 29	9,506	11,393	8	55,291 +	6,977
Kalgoorlie	Dec.	2,905	3,018	52	33,420 +	1,596
La Plata	Feb.	4,016	4,346	9	8,879 +	331
Lima	Jan.	33,043	34,014	4	34,014 +	971
Lisbon Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks) Rs.	Feb. 15	27,430	29,860	6	96,243 +	11,427
Manila $	Dec.	132,500	141,350	52	1,495,534 —	108,031
Manaos	June	12,530	9,868	8	20,067 —	5,340
Melbourne	Dec.	...	72,658	...	...	...
Mexico $	*	...	...	...	...	...
Montevideo	Feb.	30,008	32,502	17	126,466 +	8,313
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763 +	74
Shanghai $	Feb. 2	22,897	33,680	...	...	...
Singapore $	Jan. 29	9,815	10,756	4	46,365 +	6,979
Toronto $	Nov.	824,634	851,113	48	8,793,719 —	502,658
Winnipeg	Dec.	368,400	377,121	52	3,499,741 —	601,561

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdeen Corporation...	Mar. 1	£1,576	£1,724	+ £148	39	£70,315	+ £4,682
Accrington Corp.	Feb. 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	Mar. 4	224	239	+ 15	43	15,387	+ 1,093
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 5	1,227	1,384	+ 157	48½	67,153	+ 6,243
Birmingham Corp.	Feb. 26	12,140	14,545	+ 2,405	48	690,085	+ 107,785
Blackburn Corp.	Mar. 1	1,014	998	— 16	48⅞	60,546	— 211
Blackpool & Fleetwood.	„ 4	366	325	— 41	9	2,897	+ 79
Blackpool Corp.	„ 2	861	930	+ 69	49	76,201	+ 3,099
Bolton Corporation	„ 5	2,548	2,585	+ 37	49	130,802	— 222
Bournemouth Corp.	„ 8	1,816	1,729	— 87	49	102,448	+ 5,360
Bradford Corporation	„ 4	5,545	5,699	+ 154	49	311,823	+ 13,106
Brighton Corporation	„ 5	800	837	+ 37	48½	52,687	+ 1,101
Bristol	„ 3	8,684	8,694	+ 10	9	82,886	+ 7,395
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	„ 4	1,449	1,533	+ 84	49	78,134	+ 3,247
Burton-on-Trent Corp.	„ 5	264	222	— 42	49	13,871	— 437
Bury Corporation	„ 5	1,270	1,275	+ 5	48½	65,169	+ 475
Cardiff Corporation	„ 4	2,461	2,569	+ 108	48	131,119	+ 1
Chatham & District	„ 2	976	951	— 25	9	9,250	+ 726
Chesterfield Corp.	„ 2	241	241	nil	48	12,957	+ 168
Colne Corporation	„ 4	227	233	+ 6	...	...	...
Cork Electric	„ 2	437	423	— 14	9	4,007	+ 161
Croydon Corporation	Feb. 25	1,551	1 470	— 81	47	85,706	+ 5,471
Derby Corporation	Mar. 4	962	993	+ 31	48⅞	50,861	+ 2,413
Dover Corporation	„ 4	250	253	+ 3	48	14,716	+ 2,317
Dublin & Lucan	„ 3	113	102	— 11	9	1,017	— 6
Dublin United	„ 3	5,422	5,584	+ 162	9	52,541	+ 4,068
Dundee City	„ 1	1,203	1,284	+ 81	41½	56,596	+ 3,617
East Ham Corporation	„ 4	1,227	1,150	— 77	48⅞	63,641	+ 5,660
Exeter Corporation	„ 3	298	294	— 4	48	17,786	+ 1,027
Gearless Motor 'Buses...	*	...	...	...	...	...	...
Glasgow Corporation	„ 4	20,133	21,389	+ 1,256	40	868,011	+ 68,743
Glasgow Subway	„ 4	1,099	1,251	+ 152	9	11,384	+ 1,371
Glossop (U. Elec. Supp.)	„ 4	108	127	+ 19	10	1,297	+ 224
Halifax Corporation	Feb. 29	1,801	1,730	— 71	47⅞	104,733	+ 942
Hastings & District	Mar. 3	704	643	— 61	9	6,508	+ 227
Huddersfield Corp.	„ 4	2,248	2,578	+ 330	48	129,183	+ 17,471
Hull Corporation	„ 4	3,050	3,122	+ 72	48	150,165	— 767
Ilford U.D.C.	„ 4	576	588	+ 12	48	31,198	+ 3,413
Ilkeston Corporation	„ 8	114	117	+ 3	49	6,583	+ 412
Ipswich Corporation	„ 4	370	461	+ 91	47	26,078	+ 4,663
Isle of Thanet	„ 4	239	219	— 20	22	5,580	— 977
Kilmarnock Corp.	„ 4	143	153	+ 10	42	7,047	+ 313
Lanarkshire	„ 2	1,635	2,065	+ 430	9	19,226	+ 3,501
Lancashire United	„ 1	1,483	1,498	+ 15	9	14,082	+ 1,023
Leeds City	„ 4	7,917	8,586	+ 669	49	434,732	+ 36,255
Leicester Corporation	„ 4	2,835	3,200	+ 365	9	29,152	+ 4,015
Leith Corporation	„ 4	631	713	+ 82	42	32,264	+ 2,744
Leyton U.D.C.	„ 2	1,500	1,337	— 163	48	76,700	+ 8,896
Liverpool Corporation	„ 4	12,379	12,812	+ 433	9½	121,654	+ 8,445
Llandudno & Colwyn B.	„ 3	246	170	— 76	13½	2,503	+ 70
London County Council	„ 9	46,816	44,255	— 2,561	45	1,997,098	— 4,516
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	„ 4	140	121	— 19	21½	2,853	— 1,002
Maidstone Corporation..	„ 2	158	152	— 6	48	10,270	+ 501
Manchester Corp.	„ 4	16,259	17,125	+ 866	48	863,483	+ 34,493
Met. Elec. Trys.	*	...	...	...	...	...	...
Nat. Steam Car Co., Ld.	*	...	...	...	...	...	...
Nelson Corporation	„ 4	150	176	+ 26	48½	9,448	+ 669
N'castle-on-Tyne Corp.	„ 4	5,604	5,726	+ 122	49	299,332	+ 28,824
Newport (Mon.) Corp.	„ 4	751	823	+ 72	49	41,095	+ 2,049
New St. Helens & Dist.	Mar. 1	859	841	— 18	35	35,458	+ 3,551
Northampton Corp.	„ 3	671	646	— 25	48⅞	34,837	+ 5,736
Nottingham Corp.	„ 2	3,129	3,501	+ 372	48	179,423	+ 14,395
Oldham Corporation	„ 6	2,001	2,148	+ 147	46	104,400	...
Portsmouth Corp.	„ 4	2,106	2,045	— 61	49	118,430	...
Preston Corporation	„ 1	837	955	+ 118	48	47,105	+ 3,058
Provincial	„ 4	1,888	1,911	+ 23	22½	45,430	+ 3,262
Reading Corporation	„ 2	642	708	+ 66	48½	38,015	+ 4,137
Rhondda Tramways	Feb. 24	1,102	1,147	+ 44	8	9,325	+ 790
Rochdale Corporation...	Mar. 4	1,467	1,530	+ 63	46½	81,781	+ 4,205
Rotherham Corp.	„ 8	963	1,197	+ 234	48	58,149	+ 8,367
Salford Corporation	„ 6	4,803	5,020	+ 217	48⅝	252,654	+ 12,197
Sheffield Corporation	„ 5	8,087	9,530	+ 1,443	49⅞	449,420	+ 63,999
Southampton Corp.	„ 1	1,193	1,373	+ 180	48	72,027	+ 8,746
Southend-on-Sea Corp.	„ 1	619	527	— 92	48	37,846	— 8,113
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	Feb. 26	655	719	+ 64	47⅞	37,514	+ 1,857
Sunderland Corp.	Mar. 5	1,267	1,411	+ 144	49	73,359	+ 2,648
Sunderland District	„ 1	508	543	+ 35	18	10,168	+ 932
Swindon Corporation	Feb. 23	168	172	+ 4	47	9,263	+ 874
Torquay Tramways	„ 24	421	360	— 61	8	3,297	+ 233
Trys. (M.E.T.) 'Buses	*	...	...	...	...	...	...
Tyneside Trys. & Tmrds.	„ 23	508	490	— 18	8	3,878	— 3
Wallasey Corporation	Mar. 4	1,053	1,103	+ 50	48⅞	61,101	+ 1,670
Walsall Corporation	„ 4	664	694	+ 30	10	7,260	+ 1,090
Walthamstow U.D.C.	„ 4	728	730	+ 2	49	42,580	+ 3,983
Warrington Corp.	Feb. 24	414	481	+ 67	47	21,990	+ 1,470
West Ham Corporation	Mar. 2	2,823	2,721	— 102	48½	148,459	+ 12,393
Wigan Corporation	„ 2	1,405	1,499	+ 94	48	73,190	+ 3,051
Wolverhampton Corp.	„ 8	975	1,086	+ 111	49	54,951	+ 3,499
Yorkshire (W. Riding)	„ 5	1,404	1,561	+ 157	10	16,024	+ 1,866

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON. Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. LARGE AND SMALL. PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

London United Tramways.—The gross receipts for the year ended December 31 amounted to £330,166 6*s.* 9*d.* Including the balance brought forward from 1914 and deducting all expenses chargeable to revenue, including an appropriation of £25,000 to reserve for reconstruction and renewals, there is a balance of £2,327 which the directors recommend should be carried forward to the next year's account. A summary of the revenue accounts for the last two years is appended :—

	1915	1914
Traffic receipts	£318,341	£316,838
Advertising receipts	4,731	5,957
Rentals	672	592
Sundry receipts	6,422	4,484
Balance brought forward	1,892	2,101
Total receipts	£332,058	£329,972
Power and running expenses	£132,501	£140,304
Administration and general expenses ...	25,375	27,251
Rents	602	585
National insurance	880	997
Contributions to employees' benefit funds ...	1,503	961
Payments to local authorities	10,767	9,964
Repairs and maintenance	62,628	60,484
Reconstruction and renewals	25,000	12,500
Interest on loan	4,478	2,787
Interest on debenture stock	65,997	65,997
Balance to be appropriated—		
Preference dividend at the rate of one half per cent.	—	6,250
Balance carried forward	2,327	1,892
	£332,058	£329,972

Traffic summary	1915	1914
Mileage open at December 31	53.5	53.5
Number of passengers carried	63,145,226	61,433,783
Number of car miles run...	7,744,894	8,996,891
Average receipts per passenger	1.21*d.*	1.17*d.*
Number of cars in stock	338	338

BRISTOL TRAMWAYS AND CARRIAGE COMPANY.

Sir George White, Bart., presiding at the ordinary meeting on March 2nd, moved the adoption of the report and that a final dividend at the rate of 6 per cent. per annum for the half-year be declared, that £20,000 be carried to the reserve fund for contingencies and renewals ; and that the balance of £5,055 be carried to the next account. For the first time in the company's history, remarked the chairman, the gross revenue exceeded half a million sterling. During the year the tramways receipts increased by £8,703 or 3.63 per cent., and the carriage department by £49,017, or 23.39 per cent. In 1908 the tramways receipts were 82 per cent. and the carriage receipts 18 per cent., while for 1915 the percentages were 49 and 51.

Largely as the result of extensions to Westbury and Filton and of the feeding of these and many other tramway routes by motor omnibus services, the tramways receipts improved from £213,104 in 1908 to £248,355 in 1915. The carriage department receipts in 1908 were £47,615, and in 1915 £258,529. In 1909 the reserve fund was £204,994, while it now stood at £286,438. In that period the directors had written off the investments, £18,762, for depreciation in market value. The dividend in 1908 was 6 per cent., whereas it was only 5 per cent. for the past year, but if, as he had no reason to doubt, the carriage department and manufacturing business continued to develop, he thought that in the matter of dividend they would also progress. The number of passengers on the cars and omnibuses was 60,272,400, an increase of 1,970,815. The Avonmouth Omnibus receipts had risen from £12,500 in 1914 to £17,000, and he did not know what that district would have done without those facilities. The company's businesses in Bath, Gloucester, Weston-super-Mare, Cheltenham, and Tewkesbury, were quite successful, and they were only deterred from introducing new services in Bristol and elsewhere owing to the depletion of the staff by the war. In conclusion the chairman made a long reference to the negotiation by the Corporation for the purchase of the tramways undertaking, and said if the Corporation would come to a decision quickly the company would meet them in any possible manner.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended February 26, the latest period for which full returns are available, give total receipts of £166,367, or £10,627 more than in the corresponding week of last year. The total length of track was 2,289 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £72 13*s.* 7*d.* per mile of single track, and last year at the rate of £68 15*s.* 9*d.*, thus showing an increase for the week of £3 17*s.* 10*d.* per mile open.

Now Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS :

MEMBER INSTITUTION OF MECHANICAL ENGINEERS ;
MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND ;
MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS ;
MEMBER MUNICIPAL TRAMWAYS ASSOCIATION ;
FELLOW PERMANENT WAY INSTITUTION.

CONTENTS.

—:o:—

FOREWORD.
"What is wrong with the Track ?"

CHAPTER I.—CONCRETE FOUNDATIONS.
Defects—Causes of fracture—Method of laying concrete.

CHAPTER II.—CONCRETE MATERIALS.
Road metal—Water gravel—Sand—Clinker sand—Trass.

CHAPTER III.—REPAIRS TO CONCRETE FOUNDATIONS
Patching—Partial repairs.—Complete renewal.

CHAPTER IV.—TRACK DESIGN.
"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.
Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

CHAPTER VI.—RAIL LAYING.
Bad rail packing—Rails canted or twisted—Anchoring and padding—Rail expansion and contraction—Curving of rails—Springing of rails—Anchoring new tracks.

CHAPTER VII.—JOINTS, FISH PLATES, BOLTS AND NUTS.
Why joints fail—Dished or hammered joints—Movement at joints.

CHAPTER VIII.—JOINT WELDING.
Methods of welding—Thermit welding—Electric arc welding process—Expansion and contraction—Oxy-acetylene process.

CHAPTER IX.—RAIL WEAR.
At joints—On new tracks—On steep gradients—On wheel tyres—Contact of wheel and tyre—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

CHAPTER XI.—CORROSION OF TRAMWAY RAILS.
Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

CHAPTER XII.—TRACK PAVING.
Effect of vehicular traffic—Cause of loose rails—Importance of quality in sets—Square-dressed setts—Nidged granite setts—Bonawe granite setts—Wood paving—Bedding of setts—Laying and ramming.

CHAPTER XIII.—RECONSTRUCTION.
Removal of tracks—Temporary tracks.

CHAPTER XIV.—SURFACE DRAINAGE AND RAIL MAINTENANCE.
Rail cleaning—Rail grinding—Rail planing.

CHAPTER XV.—SPECIAL TRACK WORK.
Design and standardisation of points—Unbroken main line crossings—Renewable plates—Switches—Mechanism for movable points—Heel pins—Tongue heel adjusters—Guard rails—Spiral tables for curves and junctions—Special track problems.

250 pages, 10 × 6½ × 1 in., with over 150 illustrations.

Price 10s. 6d.

A WORK OF REFERENCE, INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 15.] LONDON, SATURDAY, MARCH 18, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 35s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY OF LONDON.

The London County Council invites Tenders for the supply of Wood Paving Blocks for use in the Tramways Department for a period of twelve calendar months from April 1, 1916.

Particulars, form of Tender, etc., may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

The person whose Tender is accepted will be bound by the contract to pay wages at rates not less and to observe hours of labour not greater than the rates and hours set out in the Council's list. Particulars of the Council's Standing Orders as to its conditions of tender and contract are given in every issue of the "London County Council Gazette."

No Tender received at the County Hall after 11 a.m. on Tuesday, March 21, 1916, will be considered.

The Council does not bind itself to accept any Tender.

JAMES BIRD,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.
March 4, 1916.

COUNTY OF LONDON.

The London County Council invites Tenders for the supply of Guernsey Granite Setts for use in the Tramways Department for a period of twelve calendar months from April 1, 1916.

Particulars, forms of Tender, etc., may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

The person whose Tender is accepted will be bound by the contract to pay wages at rates not less and to observe hours of labour not greater than the rates and hours set out in the Council's list. Particulars of the Council's Standing Orders as to its conditions of tender and contract are given in every issue of the "London County Council Gazette."

No Tender received at the County Hall after 11 a.m. on Tuesday, March 21, 1916, will be considered.

The Council does not bind itself to accept any Tender.

JAMES BIRD,
Clerk of the London County Council.

County Hall, Spring Gardens, S.W.
March 4, 1916.

COUNTY BOROUGH OF BURNLEY.

TRAMWAYS DEPARTMENT.

The Corporation invite Tenders for the supply of Uniforms for one year commencing April 1, 1916, for Drivers, Conductors, Inspectors, etc.

Particulars and Forms of Tender may be obtained from Mr. Henry Mozley, General Manager, Queen's Gate, Burnley.

Tenders, addressed to "The Chairman, Tramways Committee, Town Hall, Burnley," and endorsed "Uniforms," to be left at my office not later than Tuesday, March 28, 1916, at 10 a.m.

The Committee do not bind themselves to accept the lowest or any tender.

PEREGRINE THOMAS,
Town Clerk.

Town Hall, Burnley.
March 7, 1916.

COUNTY BOROUGH OF OLDHAM.

UNIFORM CLOTHING.

The Tramways Committee invite Tenders for the supply of Uniform Clothing for Inspectors, Motormen, Conductors (Male and Female), Linesmen, Chauffeurs, etc., for the twelve months ending March, 1917.

Specification and Form of Tender, with Conditions, may be obtained from Mr. J. Brierley, Traffic Superintendent, Wallshaw Depot, Oldham, at whose office samples of Clothing may be inspected, and full information obtained.

Tenders, addressed to the "Chairman of the Tramways Committee, Wallshaw Depot, Oldham," and endorsed "Tender for Uniform Clothing," must be delivered not later than 10 a.m. on Wednesday, March 22, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

J. H. HALLSWORTH,
Town Clerk.

Town Hall, Oldham.
March 10, 1916.

REDDITCH URBAN DISTRICT COUNCIL.

ELECTRIC SUPPLY DEPARTMENT.

The Council invite Tenders for the supply of 125 tons of D.S. Nuts per week for the three months ending June 30, also for six months ending September 30, in trucks to Redditch Railway Station.

Sealed Tenders are to be addressed to the undersigned and endorsed "Tender for Coal," to be received not later than March 28, 1916.

The Council do not bind themselves to accept the lowest or any tender.

R. N. MAYNE,
Chief Engineer.

Electricity Works, Redditch, Worcestershire.

THE SOUTH INDIAN RAILWAY COMPANY, LIMITED.

The South Indian Railway Company, Limited, are prepared to receive Tenders for the supply of—

QUILON-TRIVANDRUM BRANCH (Metre Gauge).

No. 1. Rolling Stock—
- 10 Steel Covered Goods Bogie Wagons.
- 7 Steel High-sided Bogie Wagons.
- 5 Steel Ballast Wagons.
- 3 Underframes for Combined Brake Van and Horse-boxes.

No. 2. Laminated Volute, and Helical Springs.

Specifications and Forms of Tender may be obtained at the Company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co., Ltd., marked "Tender for Rolling Stock," or as the case may be, must be left at the offices of the Company not later than one o'clock on Wednesday, the 29th instant.

The Company is not bound to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 20s. for each copy of Specification No. 1 and 10s. for each copy of Specification No. 2.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M Inst. C.E., Consulting Engineer to the Company, 3, Victoria Street, S.W.

91, York Street, Westminster, S.W.
March 14, 1916.

POSITIONS VACANT.

SWITCHBOARD ATTENDANT.

Switchboard Attendant required for combined three-wire lighting and traction supply station. Experience in three-phase generation a recommendation, but not essential. Wages, 35s. per week, rising yearly 2s. 6d. per week to 40s. Only applications from persons whose present employers are willing to release them will be considered.

Write, stating age, experience, and enclose copies of not more than two recent testimonials, to Mr. G. R. Spurr, Electrical and Tramways Engineer, Priory Avenue, Walthamstow.

Digitized by Google

LLANDUDNO ELECTRICITY WORKS.

Wanted, Engine Driver in Electricity Supply Station during eight-hour shift. Applicants must have had similar experience and be familiar with high-speed engines.

Applications to be forwarded to Electrical Engineer, Electricity Works, Llandudno, stating age and wages required, enclosing copies of testimonials and when appointment can be taken up.

Applicants eligible for the Army or on munition work will not be entertained.

NUNEATON CORPORATION.

ELECTRICITY WORKS.

The above Corporation have a vacancy for a Switchboard Attendant. Discharged soldier or sailor, or rejected man familiar in the least degree with electrical work. Progressive station. Salary according to ability.

Apply to Harold Hodges, Acting Electrical Engineer, Electricity Works, Coton Road, Nuneaton.

March, 8, 1916.

ENGINEER-IN-CHARGE.

Engineer-in-Charge of a Shift, with previous experience, is required in an A.C. and D.C. power station. Salary £2 2s. per week, including War bonus.—Apply, stating experience and age, and enclosing copies of not more than three testimonials, to the Burgh Electrical Engineer, Blackhall, Paisley.

INSPECTOR.

Inspector wanted, experienced in drivers' and conductors' duties; preferably accustomed to Westinghouse magnetic brake. Must be ineligible for military service. State age and experience.—Burton & Ashby Light Railways, Swadlincote.

ENGINEER-IN-CHARGE.

Engineer-in-Charge required for period of the War. Salary £3 per week.—Apply to Mr. G. G. Bell, Hammersmith Borough Council, Electricity Department, 85, Fulham Palace Road, Hammersmith.

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.
Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 3488 Leeds. MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS' SUPERFINE PAINTS
and
EXTRA DURABLE VARNISHES
for
TRAMCARS.

DOCKERS' "HERMATOR" PAINTS AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

THE AUTOBUS

IN THE TRAMWAY WORLD.

Motor Traffic Section.

When "The Tramway and Railway World" was founded in 1892, motor traction was, of course, scarcely dreamt of, but the avowed object of the paper was to encourage all new methods that gave promise of usefulness.

In pursuance of that policy the progress of motor traction received early attention. Commenting on the historic motor parade to Brighton in 1896, "The Tramway and Railway World" predicted that

> "It would give a prodigious impulse to transport both by road and rail."

Within a decade this prophecy was abundantly fulfilled and so much space has been devoted to the new industry that in 1906 a special

MOTOR TRAFFIC SECTION

was added. Every illustrated issue thus contains a section devoted especially to motor cars for Public Service, and includes articles on current topics, illustrated descriptions of new types of vehicles and accessories, and the latest news.

Public Service Motor Cars.

The importance of this section will be gathered from the fact that an increasing number of the leading municipal authorities, railway and transport companies, now own and operate large fleets of motor vehicles of various types, including omnibuses, char-a-bancs, motor lorries for the transport of goods, parcel delivery vans, tower wagons, motor street sweepers, etc.

Digitized by Google

THE
Tramway AND Railway World
Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. Including 64 issues, of which 12 are illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MARCH 18th, 1916.

A REGULATION TO AID CAR LOADING.

In a few towns covered and uncovered queues have been adopted to facilitate car loading at busy centres, but there are many other places where, in the absence of such structures, disorderly crowding takes place. A worse result than that, from the traffic manager's point of view, is that cars are delayed by the crowding of people to gain entrance. With a car in charge of a conductor who is lacking in firmness, the incoming throng even invade the platform on one side of the upright, thus preventing rapid unloading. Now that many cars are in charge of women conductors, there is a risk of considerable extension of such invasion, especially in towns where conductors are not encouraged to collect the fares on the platform whenever practicable. A plan that will bring about a reform of the bad habit into which the public have been allowed to drift is to be welcomed for a variety of reasons besides those already enumerated. A proposed regulation submitted on Tuesday last to Bradford City Council by the Watch Committee seems to be one well worthy of adoption. It is framed in the following terms :—

On occasions when six or more persons being intending passengers by the Corporation's tramway cars or any of them are waiting at any tramway stopping place or terminus in any of the streets specified in the schedule hereunder written to enter such tramway cars or any of them they shall form up in a line or queue, and no such intending passenger nor any other person shall take or endeavour to take any position in such line or queue when formed except in proper order behind the last person in such line or queue or shall enter or endeavour to enter any such tramway car otherwise than in the order in which he was entitled to take up his position as aforesaid.

The schedule contains a list of tramway routes. The action of the Bradford Watch Committee was confirmed, and it is to be hoped that the example will be followed in other towns. There are few places where at one time or other complaints have not been made of women and children being pushed out of their positions, to say nothing of damage to clothing. The Bradford Watch Committee may be presumed to be acting upon the advice of the Chief Constable. To have secured the support of that official means that the aid of the police will be given in order to secure the observance of the regulation. The present juncture is opportune for bringing the restriction into operation. In many towns war industries have led to a great increase in travelling. The war has also entailed the disciplining of the public in the matters of the drink traffic and lighting, so that people ought not to be averse to a regulation that will add to the general comfort as well as assist the women conductors. Combined with "safety" teaching, the new rule should be implanted in the minds of school children. As for adults, a liberal use of printer's ink will make them acquainted with the requirement. We would remind tramway authorities that there is another method by which they may ensure speedy loading and unloading. It is by the use of the front platform as a means of exit on the near side. Huddersfield possesses several cars fitted for operation in that manner, and the innovation is one that receives the approval of the Board of Trade, as was further shown when sanction was given in connection with the running of prepayment cars Many new cars will be ordered before the war terminates, or soon after, and managers should no longer be bound by obsolete design. An additional advantage of a front exit is that it will reduce the danger incurred by passengers from oncoming vehicles through having to stand in the roadway when people are alighting from the rear end. This element of danger increases every year, and the time may come when tramway authorities will be asked why they should not be compelled to adopt methods that will lessen the obstruction of the roadway.

THE EMPLOYMENT OF WOMEN.

DEPÔT MEN TRAINING AS MOTORMEN.—WOMEN DRIVERS AT MUSSELBURGH.—L.G.O. CONDUCTORS.

At Leeds, 140 men, mostly elderly, are acting as car cleaners. By substituting women the management hope to release many of the men to be trained as motormen. Besides using women for the work of sweeping and washing of the cars the authorities desire to arrange for them to undertake the cleaning of some portion of the working parts of a car. There is an urgent need for more motormen in order to meet the demand for the transport of munition workers. The average number of early morning cars in use is about 230, but the request for further facilities in all parts of the city is so great that 400 cars could be utilised.

In consequence of the local military tribunal having granted only temporary exemption to several of their unmarried motormen, the Musselburgh Tramways Company have engaged a number of women to be trained to fill the vacancies.

On the Torquay tramcars the women conductors are giving satisfaction both to the management and the public.

A writer in a Wolverhampton newspaper refers to the great convenience to passengers of the women conductors at Birmingham calling out "in fine, firm, resonant tones the name of the district their car is bound for." This is especially appreciated on dark nights, even although there is a transparent destination number on the dashboard light.

Girls are being employed as engine cleaners in the London and North-Western Railway sheds at Crewe.

On the Metropolitan Electric Tramways Company's cars over 150 female conductors are now at work, and on the cars of the London United Tramways Company there are 120 women.

Early experience augurs well for the efficient working of the London General Omnibus Company's women conductors. The first eighty, who have come forward to fill the places of the men who have responded to the country's call, began work on service vehicles on March 14. This batch will be rapidly followed by another 250 and the number in training is being added to daily. The uniform, which is attractive, consists of dark blue Norfolk jacket with white piping, skirt reaching three inches below the knee, alpine hat turned up at the side with a "General" badge in front, leather and cloth gaiters reaching to the knee. The new conductors are working the same hours and receiving the same pay as the men. Special arrangements have been made for their training at the Chelsea School, where they have received thorough instruction, including a geographical knowledge of the routes they will serve. Special catering arrangements and lavatory accommodation has been provided for at the garages and terminal points. At the training school on March 13 the first 300 women conductors had a musical send-off, at which they provided their own programme.

Glasgow Tramways Committee have passed a resolution instructing the general manager to maintain the tramway service by the employment, if possible, of male drivers, but authorising him, in the event of men not being available, to engage women on the same terms and conditions.

Digitized by Google

BRISTOL AND TRAMWAYS PURCHASE.

A report was presented to Bristol Corporation on March 14 by the Tramways Option Committee, stating that the Tramways and Carriage Company were unwilling to pay any wayleave, and the concessions "in the way of revision of fares or otherwise" were not sufficient to justify a waiving of the option of purchase for 7, 14, or 21 years. In these circumstances the committee were not prepared to make any recommendation about the main question of purchase of the tramways, but asked for leave to keep the option alive by applying from time to time to the Board of Trade, under the Special Acts Extension of Time Act, for further extension of the period during which the right might be exercised.

Alderman Pearson, chairman of the Committee, in moving the adoption of the report, said the Council were now in the position they sought to obtain in 1913; they had the power to work tramways, although it had taken a long time to get it, and the expenditure had been considerable. The Committee could not advise the acceptance of the company's offer to take Corporation stock at 5½ per cent. in payment for the undertaking; if the company got such terms they would be thankful to the end of their lives. The company now proposed that the city should take over the omnibuses with the tramways. So far as the present figures were concerned, he advised the Council not to consider the suggestion, for whilst the omnibus traffic had grown, the revenue had gone down.

Councillor Gane, in seconding, said the failure of the negotiations was due to a number of circumstances, one of which was the division of opinion in the Council upon the main question. The committee employed three experts, perhaps the most eminent, and yet by some they seemed to be regarded as blind guides, and to these people their reports and valuations were like the mirage of the desert. The committee had since tried to obtain for the public a two-mile ride for a penny. At present the penny ride slightly exceeded 1½ miles, as against 1¾ miles at Edinburgh, Bolton and Nottingham, 2 miles at Leeds and Belfast, 2¼ miles at Glasgow and Birmingham, and over 2½ miles at Salford, Liverpool, Sheffield, Hull, and Manchester. The annual profit of the tramways was estimated at £37,000, and there was the possibility of the growth of the undertaking.

During further discussion, Alderman Sheppard alleged that the extra charge of £1,000 for roads in the current estimates was due largely to the damage done by the company's omnibuses. The Council adopted the report without a division being asked for.

CORPORATION OMNIBUSES AND ROAD UPKEEP.

In a report presented to Walsall Town Council on March 13, the Works Committee stated that the Road Board could not see their way at the present time to make a grant towards the cost of re-surfacing Stafford Road, Bloxwich, which had been worn out by the Tramways Committee's motor omnibuses. The Tramways Committee therefore had been asked to pay an amount corresponding with the sum they had agreed to pay to the County Council for the adaptation of roads in the latter's area for motor omnibus traffic, together with a contribution of ⅜d. per omnibus mile in respect of the cost of maintaining the road. Alderman Cope, chairman of the Tramways Committee, suggested that the matter should be deferred until the point at issue had been settled by Parliament. The Tramways Committee would agree that any decision arrived at by Parliament should be retrospective. This suggestion was agreed to.

TRAMWAYS UNDER THE MUNITIONS ACT.

Newport Council were informed at their March meeting by Councillor J. Moxon, the chairman of the Electricity and Tramways Committee, that under a recent order those departments had now become controlled undertakings, so that the applications regarding wages would have to be dealt with by the Government authorities. No tramway employee could now leave without a leaving certificate. The Sunday cars lately put on were only intended for munition making purposes; not the thin end of the wedge. The Mayor remarked that neither the Town Clerk nor himself were aware that the tramways were a controlled undertaking.

West Hartlepool Council have approved of the action of the Tramways Management Sub-Committee in applying to the Ministry of Munitions to have the tramways undertaking certified under the Munitions Act.

Bradford Tramways Committee have applied for the tramways undertaking to be scheduled as a controlled establishment.

EMPLOYEES' EXEMPTION CLAIMS.

At the Glasgow Tribunal appointed under the Military Service Act, a motorman appealed for exemption on personal grounds. A letter was read from Mr. J. Dalrymple, general manager of the Corporation Tramways, stating that there was very great difficulty in obtaining motormen, and urging that the applicant should not be called up at once. Postponement till June 10 was granted.

A claim was made at Mansfield by Mr. C. R. Walker, general manager and secretary, Mansfield and District Light Railway Company, for exemption of a motorman. He stated that the company had sent forty-two to the Army, that the cars were now understaffed, and that the service had suffered. He had tried to obtain discharged soldiers for the work, but had not succeeded, and had been compelled to employ boys as drivers. The military representative observed that he had seen a boy driving very well. The general manager said that more boys could not be found, and in reply to the military representative he added that the boys were being paid the same wages as men started at. The application was not granted.

Exemption for six months was granted to a conductor at Great Yarmouth. The man said he was thirty-eight years of age and was the support of his widowed mother. In April last he offered to enlist, but was rejected. Since then he had been accepted for home service.

STREET TRAFFIC DANGERS.

The extent to which decreased lighting and other war-time conditions have added to street traffic dangers is clearly indicated in the return of accidents issued on March 15 by the Home Office. It shows that during the twelve months to December 31 last 3,014 persons were killed and 60,189 injured by vehicles on public highways in the United Kingdom.

These figures, the highest yet recorded, give an average of over eight deaths and nearly 165 cases of injury per day. They compare as follows with previous returns:

	Killed.	Injured.	Total.
1909	1,151	16,872	18,023
1910	1,327	29,750	31,077
1911	1,557	33,653	35,210
1912	1,764	36,833	38,597
1913	2,099	42,544	44,643
1914	2,330	59,340	61,670
1915	3,014	60,189	63,203

Mechanically-propelled vehicles were almost entirely responsible for last year's increase. They caused 614 more deaths and 4,597 more cases of injury than in 1914. Fatalities due to horse-drawn vehicles rose by fifty, but, on the other hand, non-fatal accidents show a decrease of 1,150. Appended are the detailed figures for 1914 and 1915:

	1914.		1915.	
	Fatal.	Non-fatal.	Fatal.	Non-fatal.
Motor Cars, Motor Vans, &c.	1,154	22,295	1,644	26,034
Motor Omnibuses	222	3,767	239	3,263
Electric Tramcars	153	7,110	260	8,372
Horse Omnibuses	5	45	—	32
Horse-drawn Tramcars	2	21	1	6
Other Horse Vehicles	626	13,190	682	12,068
Pedal Cycles	168	13,012	188	10,414
Totals	2,330	59,340	3,014	60,189

ACCIDENTS IN LONDON.

In the Metropolitan Police district last year there were 847 fatal and 25,640 non-fatal accidents, and in the City twenty persons were killed and 1,229 injured. Of the deaths in the whole of the London area, including the City, 156 were caused by motor 'buses, 439 by other motor vehicles, 87 by tramcars, 172 by horse-drawn vehicles (other than tramcars or 'buses), and 13 by pedal cycles.

As many as 10,158 persons were injured by motor cars, motor vans, etc., 4,020 by electric tramcars, 2,786 by motor 'buses, 5,482 by horse-drawn vehicles, and 4,423 by bicycles. Below is the record of fatal and non-fatal accidents in the Metropolitan Police district and the City for the last seven years.:

	Met. Police District.		City of London.	
	Fatal.	Non-fatal.	Fatal.	Non-fatal.
1909	287	11,731	16	1,354
1910	348	12,493	19	1,363
1911	385	13,849	25	1,405
1912	514	15,291	24	1,360
1913	579	18,365	17	1,210
1914	637	25,239	19	1,253
1915	847	25,640	20	1,229

MISCELLANEOUS NEWS AND NOTES.

Seats for Women Conductors.—Darlington Tramways Committee are considering the question of providing seats for the female conductors.

Soldiers' Fares.—Except on the circular routes, soldiers are to be allowed to travel for half fare on Blackpool Corporation tramcars from April 1 onwards.

Return Tickets for School Children.—Scholars attending the Darwen schools are now able to purchase return tickets at a charge of one penny.

Wigan Power Station.—As a sequel to the recent breakdown at Wigan generating station, the Council have requested Mr. S. L. Pearce, city electrical engineer at Manchester, to prepare a report on the electricity undertaking.

The Need for a Safety Movement.—During the year ended December 31 last, 515 persons received injuries or damages to their clothing through attempting to board or alight from tramcars at Leicester while in motion.

The Gateshead Accident. The grand jury at Durham Quarter Sessions have thrown out the bill against the Gateshead tramcar driver who was indicted for manslaughter in connection with the recent tramcar accident.

Women Drivers at Blackburn.—Mr. J. H. Cowell, general manager of Blackburn Corporation Tramways, has decided to engage women to act as motormen. One is in training at the present time, and if she proves capable, others will be engaged.

Trailers Proposed for Cardiff.—Owing to the shortage of men only sixty per cent. of the Cardiff cars are now running. Mr. A. Ellis, the general manager, has asked the Board of Trade for sanction to the use of trailers in order to assist in making good the deficiency.

Supply of Energy at Swansea.—Arrangements are being made for Swansea Tramways Company to purchase three times the amount of energy that they now take from the Corporation electricity works.

The Need for a Front Exit.—Complaint was made at a meeting of Darlington Council of the danger of allowing passengers to leave by the off side of the front platform. Alderman Pease, in reply,

Digitized by Google

said it was difficult to prevent this being done when the cars were very crowded, but he had seen persons stopped from doing it.

A Company's Generosity.—On certain Grimsby tramway routes workmen's tickets at reduced fares are in operation until 9 a.m. Efforts are now being made to get a similar concession on the Hainton Street route, where such tickets are now issued until 8.30 a.m.

Hospitality to Employees.—The secretary of Huddersfield branch of the Tramway and Vehicle Workers has published a letter of thanks to the residents of the town and district for providing food and shelter to the car employees during the cessation of traffic on the occasion of the recent air raid in the Midlands.

No New Railway Guide Books.—In view of the scarcity of paper, the Railway Executive Committee has decided to make further economies in respect of time-tables, etc. It is understood that no new guide books are to be printed for the present, and posters of seaside resorts will also probably be abolished.

German Iron Industry.—At the annual meeting of the Union of German Ironfounders, at Dusseldorf, on March 13, Dr. Petersen declared that as regards manganese, Germany could stand any duration of the war. This was also true, he added, as regarded all other material necessary for the iron industry.

Liability for Collision with a Cow.—Judgment for £24 odd, damages sustained through a cow being knocked down and killed by a tramcar, during darkness, was given against Mansfield and District Tramways Company on March 13, at Mansfield County Court.

Omnibuses for Manchester Munition Workers.—As soon as the six Daimler chassis are delivered to the Tramways Department and fitted with bodies the vehicles will be used to carry munition workers to districts where there are no other facilities. The Corporation have had to wait until now to replace the omnibuses taken by the military authorities at the outbreak of the war.

Courtesy Training for Children.—A circular sent to Bradford Education Committee by the Tramways Committee, relative to the conduct of children in tramcars, has produced a good effect, thanks to the exhortations of the teachers. One subject of complaint was that children retained seats while elderly passengers were standing.

Southport Tramways Company.—The negotiations for the acquisition of Southport Tramways Company's undertaking by the Corporation have been deferred until after the war. Recently the Tramways Committee asked permission to take an expert's advice on the valuation, but the Council deemed it inexpedient at the present time to incur any expenditure.

London Suburban Stations Closed.—Owing to the heavy pressure on the lines and rolling-stock of the South Eastern and Chatham Railway, the following stations will be closed to passenger traffic from April 3 next:—Battersea Park Road, Wandsworth Road, Clapham, Camberwell, Walworth Road, Brixton, and Loughborough Junction. The company's service to Moorgate Street will be temporarily suspended.

Edinburgh Tramways.—Notices of motion given for the next meeting of the City Council include remits to the Tramways Committee to consider the expediency of appointing a tramways manager and establishing a tramways department; also the advisability of appointing a tramways engineer to attend to the interests of the Corporation during the remainder of the lease of the Edinburgh and District Tramways Company, which expires in June, 1919.

London and South Western Electrification.—Electric trains began to run on March 12 on the loopline at half-hour intervals. During the busy periods steam trains are also run. Hounslow trains complete the "loop," via Richmond, thus giving two extra trains both ways each hour between Twickenham, Richmond, Barnes, Putney, and Waterloo. A new station has been opened at Barnes Bridge.

Important Recommendation at Manchester.—The Manchester, Liverpool and Counties Commercial Motor Users' Association have discussed a recommendation reported to have been made by the general manager of the Corporation Tramways for prohibiting motor wagons using tramway tracks. The meeting resolved to ascertain the views of the Tramways Committee on the proposal, and to ask the Association's Parliamentary agents to inquire as to the possibility of any Bill being put forward on the question.

Manchester Tramway War Collections.—The citizens of Manchester are to be congratulated upon the continued success of the collections in aid of war funds by means of boxes affixed to the Corporation tramcars and motor omnibuses. Their thanks are due to Mr. J. M. McElroy, the general manager, for supplying the exhortation and persuasion that has resulted in such liberal support being forthcoming. Up to March 11 the total amount collected for forty-three charities was £20,303 15*s.* 2*d.*

Accrington Tramways First Accident.—The first serious mishap on the Corporation Tramways since the opening of the undertaking in 1907 occurred on the evening of March 11. For some unexplained reason a car bound for Clayton ran beyond the loop in Whalley Road and collided on the straight with an inward car. The driver of the latter car was seriously injured. This is the first case of injury sustained by a tramway employee, either on the road or in the car shops.

More Omnibuses for Walsall.—The Corporation on March 13 voted £3,886 from the tramways and motor-omnibus profits during the year ended Dec. 31 last, for the purchase of additional omnibuses. Ald. J. Cope, chairman of the Tramways Committee, stated that the income from the omnibus service during the few months it had been in operation was £4,099, and the balance remaining was £928. Nearly half the capital borrowed in respect of the tramways undertaking had been repaid.

Tramway Plant for New Zealand.—The Board of Trade Branch at 73, Basinghall Street, E.C., have received a copy of the specification, form of tender, etc., together with a blue print in connection with a call for tenders by Wanganui Borough Council for the supply, delivery, and erection of additional plant at their tramway power house, including pressure type gas producer plant, gas engine, electric generator and switch gear. Sealed tenders, on the proper form, will be received by the Town Clerk up to noon on May 9, and should be accompanied by a cash deposit or a marked cheque for £250.

The Zenith Carburettor.—There is a mistaken impression amongst some motorists that reduced consumption means loss of power, an impression which, as a matter of fact, is, with a properly-fitted carburettor, the reverse of what is really the case. As an illustration, Mr. G. Perry, of 49, Old Bailey, E.C., relates that he took every hill between Lewes and Caterham on the top gear, in his four-cylinder Parry car, with passengers weighing collectively seven hundred lbs. The consumption with his Zenith carburettor was at the rate of thirty-four and a half miles to the gallon. This is the combination for which the motorist is seeking nowadays.

Utility of Books of Tickets.—Complaint having been made of trouble caused to conductors through passengers not providing themselves with small change, Mr. A. Ellis, the tramways manager, reminded the Tramways Committee that books of tickets were obtainable. As this facility does not appear to be generally known, he has arranged that greater publicity shall be given to it. Councillor Blower, a member of the Committee, suggested that at busy places people might be booked before boarding the cars, but the Committee were of opinion that the books of tickets would answer the purpose.

Concessions to Employees.—On the recommendation of Derby Tramways Committee the motormen's wages have been increased from 7¼*d.* to 7¾*d.* per hour. The Committee could not see their way to grant the increase to the other employees, who had sent in an application for 1*d.* an hour, although last year they were given a war bonus of 2*s.* in cases where wages were below 30*s.* Birkenhead Council have rejected a recommendation for doubling the war bonus of the tramways employees, but have agreed to pay 2*s.* for extra work done by motormen of cars in charge of female conductors.

Bad Coins and Evasion of Fares.—It is reported that at Glasgow the female conductors have been instructed to accept fares only in coppers, in order to stop the passing of bad coins in the dark. Leeds tramway authorities have destroyed a considerable quantity of counterfeit and foreign coins that were taken by conductors. Mr. J. B. Hamilton, the general manager, in an interview on the subject, has stated he does not think that a request to pay in coppers, if legal, would work. By means of placards the public were asked, however, to have their exact fares ready. Consideration is being given at Leeds to the question of the steps to be taken to prevent persons leaving the car without paying the fare when the conductor is on the top deck.

The Queue Proposal at Bradford.—On March 14 Bradford Corporation discussed the recommendation of the Watch Committee for requiring six or more intending passengers by tramcar at scheduled places to form up in line. Alderman Hayhurst asked whether under section sixty-one of the Corporation Act of 1903 there was power to prosecute, and what was the penalty. The Town Clerk replied that there was such power, but he could not say off-hand what the penalty was. Councillor Palin, who is secretary of the Tramwaymen's Union, remarked that the proposals were insufficient but were the best that could be made at present, and would involve people submitting themselves to discipline. The recommendation was adopted.

London Traffic Report.—The annual report of the London Traffic Branch of the Board of Trade shows that, taking local railways, tramways, and omnibuses, the total approximate number of passengers carried in 1914 was 2,064,612,057, compared with 972,465,682 in 1903, and the number of journeys per head of population 276.5, compared with 144.9. For the purposes of the comparison the population of Greater London in 1914 is taken as 7,465,278, and in 1903 as 6,710,272. The number of licences issued for cabs, omnibuses, and tramcars in the twelve years from 1903 to 1914 shows that whereas in 1903 there were 3,905 four-wheeled vehicles drawn by horses and only one mechanically propelled, in 1914 there were 1,159 drawn by horses and 7,260 mechanically propelled. In 1903 the horse-drawn omnibuses numbered 3,623, and mechanical 13, as against 63 and 3,057 in 1914. For tramcars the figures were 1,148 (horse) and 576 (electric) in 1903, as compared with 20 (horse) and 2,019 (electric) in 1914.

Petrol Economy.—The Petrol Sub-Committee of the Commercial Motor Users' Association have recommended that the following points be brought to the notice of the members with a view to encourage further economies in the use of petrol:—(a) That a bonus shall be offered to drivers, based upon present average consumptions, to the extent of half the value of the petrol saved; (b) That an accompanying instruction shall be issued to drivers to stop the engine when the vehicle is collecting or delivering, or when a halt (other than in traffic) may exceed one minute in duration. The Committee of the Royal Automobile Club have recommended the discontinuance of the practice of using private cars as a daily means of transport from the country to places of business in towns, where railways or public service vehicles are available. The Committee state that representations are being made to the local authorities to see that stocks of petrol are not laid in far in excess of those allowed by law, a practice that has led to shortage at a time when there was no real deficiency. Provided that the motoring public adopt their suggestion, the Committee are assured that the wholesale and distributing companies are confident of being able to keep up the supplies necessary for legitimate use.

Digitized by Google

PERSONAL.

Mr. J. W. Horton, traffic superintendent, York Corporation Tramways, has been granted an increase of salary according to scale.

Mr. W. A. Cocking, engineer to the British Automobile Traction Company, Ltd., who had been named as manager of the new Cotton Industries Motor Transport Company, Ltd., Manchester and Liverpool, is remaining with the first-named company.

Mr. W. F. Long has been presented with a piece of silver plate to mark his retirement from the position of city electrical engineer of Cape Town. Mr. S. J. CLUNAS, manager of the power station, has been appointed acting city electrical engineer, and Mr. Purvis, his assistant, has become the manager.

Sir John Courtis, chairman of Cardiff Tramways Committee, and a former Lord Mayor of that city, has presented the Corporation with a photogravure of the members and chief officials who were present in the assembly-room of the City Hall in June, 1913, on the occasion of the visit of the King and Queen, and the knighting of Sir John Courtis. The photogravure was unveiled by the Lord Mayor at a meeting of the Council on March 13, when Sir John Courtis was thanked for the gift.

Mr. R. A. Dawbarn died on March 6 at the age of 55 years, after a short illness. As a member of the firm of Messrs. Mordey and Dawbarn, consulting engineers, he had carried out many electrical installations during the past sixteen years, both in this country and abroad. Formerly Mr. Dawbarn was with Mr. J. S. Raworth while that gentleman was superintending engineer to the Brush Company, in which capacity he was engaged in work in Great Britain and Australia.

CONTRACTS AND ORDERS.

Sheffield Council have accepted the tender of A. Reyrolle and Co., Ltd., for the supply of sub-station switchgear, at £4,426.

Bruce Peebles and Co., Ltd. have received an order for the supply of a 750 k.w. rotary converter to Wolverhampton Council.

Edgar Allen and Co., Ltd., of Sheffield, have been awarded a contract for supplying points and crossings to Southampton Corporation Tramways.

British Insulated and Helsby Cables, Ltd. have received an order for the supply of trolley wire to the approximate value of £743 to Leyton Urban Council Tramways.

FINANCIAL REPORTS AND MEETINGS.

Dick, Kerr & Co., Ltd., have paid an interim dividend at the rate of 6 per cent. per annum on the preference shares.

Hadfields, Ltd.—The directors recommend for the past half-year a final dividend of 2*s.* and a bonus of 2*s.* per share, tax free, making 5*s.* per share (25 per cent.) for the year. The distribution amounted to 22½ per cent. for 1914, 20 per cent. for each of the two preceding years, and 17½ per cent. for 1911.

South Metropolitan Electric Tramways Company.—The annual report gives the revenue for 1915 as £69,286, and after providing for all expenses and adding £4,500 to the renewals fund, there is a divisible balance of £15,488. A dividend of 5 per cent. is proposed on the preference shares for 1914, and 1 per cent. on account of the past year, adding £4,500 to the reserve, and carrying forward £812.

Waste Heat and Gas Electrical Generating Stations Company.—The net profits for the year ended January 31 were £39,819, and £14,212 was brought forward. A final dividend of 5½ per cent. is proposed, making 8 per cent. for the twelve months, adding £11,000 to the reserve, and carrying forward £17,431. At the annual meeting, which was held at Newcastle on March 8, the dividend was declared, and the sum of £500 was voted to war relief funds.

North Ormesby, South Bank, Normanby, and Grangetown Railless Traction Company.—Mr. W. W. Storr, who presided at the annual meeting at Middlesbrough, on March 13, said the paid-up capital was £21,678. The cost of the Act (including the Middlesbrough Corporation opposition) was £4,012, while buildings and overhead equipment absorbed £14,139, and land and sundries £2,755, a total of £20,906. If the cars could be delivered they would be able to start running any day. Mr. T. Edwards was re-elected a director.

Stewarts & Lloyds, Ltd.—After making provision for estimated contingencies under the Munitions of War and Finance Acts, the board recommend a dividend of 2*s.* and a bonus of 6*d.* per share on the deferred shares for the past year, placing £60,000 to general reserve, and £20,000 to employees' benefit reserve, and carrying forward about £100,000. Similar distributions (12½ per cent.) were made on the deferred shares for each of the two previous years, £60,000 being reserved, and £97,666 carried forward twelve months ago, and £70,000 and £95,371 respectively at the end of 1913.

Walsall Corporation Tramways.—For the year ended December 31 last, the passenger receipts were £39,551, equal to 12.908*d.* per car mile. The total revenue was £40,291 (13.217*d.* per car mile). The passenger receipts showed an increase of £6,040, and were the highest on record. Compared with the first year of the undertaking the increase was £14,427. The car mileage was 731,640, and the passengers 7,886,190, exclusive of over 8,000 soldiers who were carried free. The working expenses were £22,955 (7.530*d.* per car mile), an increase of £1,133. Alderman J. Cope, chairman of the Tramways Committee, informed the Council on March 13 that the amount paid in wages was £12,526, equal to 5*s.* 11*d.* of every sovereign received in fares. Allowances had been made to the dependents of employees serving with the colours to the extent of £854. The profit for the year was £7,886. Nearly half the capital borrowed in respect of the undertaking had been repaid. A reference to the successful working of the motor omnibus department appears in another column.

Metropolitan Electric Tramways Company.—Mr. E. Garcke presided at the annual meeting on March 13. In moving the adoption of the report (published in our issue of March 11) the chairman said the service was reduced during the greater part of the year owing to the shortage of men caused by employees joining the forces, and also owing to the strike in May last. In the autumn the police permitted the employment of women as conductors. More than 150 were now employed, and it was probable that that number would be largely increased. The thirteen days' strike caused a loss of £16,300 in receipts. But for these two factors there would have been a large increase in the receipts. For the whole year the traffic receipts had been very good, notwithstanding a reduction of over fifteen per cent. in the car mileage. The total expenses, including payments to local authorities, repairs, and maintenance, and interest were £470,400, or about £24,000 less than in 1914. This reduction went a long way towards neutralising the falling off in the receipts of £18,000. Mr. C. G. Tegetmeier seconded the motion, which was adopted. A dividend of one per cent. was agreed to on the ordinary shares.

London United Tramways, Limited.—At the ordinary general meeting on March 13, Mr. W. M. Ackworth (chairman) said that the Brentford and Hounslow line had been completed at a cost of £22,855. The traffic receipts showed an increase of £1,503 due to increased labour being employed in the districts served by the tramways, and also to the special car traffic. The car mileage was considerably less. Owing to enlistments the difficulty in maintaining the services had at times been acute, but late in the year the police sanctioned the employment of women as conductors. There were now about 120 so employed, and the number would increase. Before the war they had 1,616 male employees; at end of December, 1914, 381 or twenty-four per cent. had enlisted, and on December 31, 1915, the number of enlistments had increased to 618 or thirty-eight per cent. There had been an increase of 1,711,000 in the number of passengers, while the decrease in the car mileage was one and a quarter million. If the expenses had been at the same ratio as in 1914 the decrease in the expenses would have been £18,258, but owing to the higher cost of materials, wages, and war bonus, the amount was only £7,800. Sir Albert Stanley seconded the motion for the adoption of the report.

Underground Electric Railways of London.—Lord George Hamilton, who presided at the annual meeting on March 10, referred to the agreement between the London Electric Railways and the London General Omnibus Company for the creation of a pool of certain receipts, and for giving through traffic and bookings without apportioning the through fares among the five companies. Each of the railway companies showed substantial improvements in their earnings for last year, and, although the operating costs had increased, the margin available for dividends was larger, and each company was consequently able to pay larger dividends than in 1914. The London General Omnibus Company showed a falling-off in revenue and a decrease in working expenses, owing to the War Office having taken a number of omnibuses for war service. The total income of the Underground Electric was £680,741, or a decrease of £3,884. The balance from the last account amounted to £38,441, making £719,182. On the debit side the four and a half per cent. bonds required £95,291 and the three-year notes £31,500. The amount paid under the guarantee on the Central London Railway assented stock amounted to £26,931, while the six per cent. first cumulative income debenture stock required £76,380 and the six per cent. income bonds £438,731. Those sums plus the amount paid for general charges, left £38,575 to be carried forward. Replying to a suggestion by Sir R. Perks that fares should be raised by an average of a farthing, the chairman stated that such a policy would encourage competition, for they had not got a monopoly of traffic.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended March 4, the latest period for which full returns are available, give total receipts of £169,819, or £10,656 more than in the corresponding week of last year. The total length of track was 2,289 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £74 3*s.* 9*d.* per mile of single track, and last year at the rate of £70 6*s.*, thus showing an increase for the week of £3 17*s.* 9*d.* per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Mar. 16.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	64½	64½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	75/-	75/-
4%	4%	Do. 4% Deb. ...	100	91	72½	72½
4½%	4½%	Do. 4½% Deb. ...	100	98½	73	74
5%	5%	Do. 5% Deb. ...	100	96	77½	77½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/16	20/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92½	92½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10½	10
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97	97
$½	$½	Brazilian Trac. & Power Ord....	$100	66	50½	50½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	89¼xd	89¾xd
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	6¾	6 1/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91½	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	39	39
5%	5%	Do. 5% Cum. Pref.	100	103	50¾	50¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	64½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	71½xd	73½
70/-	70/-*	Do. 7% Pref.	100	55½	45⅝	46
—	—	Do. 6% Pref. Ord.	100	17½	15¼	15½
—	—	Do. Def. Ord.	100	11	10	10¼
5%	5%	Do. 5% Deb.	100	92	80½	81½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69¾	68¾
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87½	87½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¼	6 1/16	6 3/32
1/3	1/3	City of B.A. Trams.	5	5½	90/-	92/6xd
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	86¼
6/-	6/-	Dublin United Trys 6% Pref.	10	12	11 3/16	11 3/16
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	77
—	—	La Plata Trams. Ord.	1	¾	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	10 1/16xd	10 1/16xd
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½xd
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	9/16	8/10½	9/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	55½	55½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	79¾	80
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48½	51
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/-	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	74xd	74
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78¾	78¾
$1¾	$1¾	Mexico Trams. Common ...	$100	70	27	33
5%	5%	Do. 1 Mt. 5% G.B.	—	84	35	35
6%	6%	Do. 6% Mt. Bds.	100	76	35	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/2*	1/2¾*	National Steam Car	1	15/16	11/7½	11/10½
9¾d.*	9¾d.*	New General Traction	1	¾	7/9	7/9
1/2¾	6d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	60/-xd	60/-
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	84	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	9/6	9/6
8d.	10d.	Provincial Trams. Ord.	1	⅞	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	89½	89
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74¼	73⅞
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88¼	88¼
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½xd
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94xd
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76½	76½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅞	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Increase or Dec.
Anglo-Argentine	Mar. 11	£50,619	£50,723	11	£505,987	+ £571
Auckland (28 days)	Feb. 11	19,932	20,518	32	169,226	+ 2,198
Ballarat and Bendigo	Jan. 2	4,439	4,438	40	32,932	— 2,772
Brazilian Traction Mlrs.	Jan.	5,996,190	6,430,000	5	6,430,000	+ 433,810
Brisbane	Feb.	34,050	30,320	9	62,600	+ 6,390
British Columbia $	Jan.	640,495	591,949	31	3,832,095	— 807,299
Buenos Aires Lacroze	Feb.	38,877	39,137	34	330,663	— 4,480
Burmah Tramway Rs.	Mar. 11	3,483	3,768	32	...	+ 7,086
Calcutta Rs.	„ 11	65,331	69,488	11	693,395	+ 45,792
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias	Feb.	1,822	1,585	9	4,426	+ 1,700
Cordoba	Jan.	11,945	12,329	44	136,477	+ 5,102
East India	Feb.	1,649	1,863	30	14,394	+ 864
Hong Kong $	Mar. 10	9,941	15,982	9	71,273	+ 13,018
Kalgoorlie	Dec.	2,905	3,018	52	33,420	+ 1,596
La Plata	Feb.	4,016	4,346	9	8,879	+ 331
Lima	Feb.	30,164	32,900	9	66,914	+ 3,707
Lisbon Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks) Rs.	Feb. 15	27,430	29,860	6	96,243	+ 11,427
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,021
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Dec.	...	72,658	...	...	...
Mexico $	*	...	...	...	...	...
Montevideo	Feb.	30,008	32,502	17	126,466	+ 8,313
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai $	Feb. 16	28,474	28,589	...	...	...
Singapore $	Feb. 5	11,062	14,015	5	60,380	+ 9,932
Toronto $	Jan.	843,351	906,350	5	906,350	+ 62,999
Winnipeg	Jan.	350,681	297,560	5	297,560	— 53,121

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	Mar. 7	£280	£351	+ £71	49	£17,667	+ £1,764
Aberdeen Corporation	„ 8	1,609	1,640	+ 31	40	71,955	+ 4,713
Accrington Corp.	Feb. 2	443	534	+ 91	44	24 521	+ 1,014
Ayr Corporation	Mar. 11	225	235	+ 10	44	15,622	+ 1,103
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 12	1,216	1,317	+ 101	49½	68,470	+ 6,345
Birmingham Corp.	„ 11	12,497	14,650	+ 2,152	50	719,340	+ 112,028
Do. Motor Omnibuses	„ 11	649	695	+ 45	—	41,032	+ 19,603
Blackburn Corp.	„ 8	1,055	1,041	— 14	49⅔	61,587	+ 204
Blackpool & Fleetwood.	„ 11	286	294	+ 8	10	3,191	+ 88
Blackpool Corp.	„ 9	581	683	+ 102	50	76,885	+ 3,182
Bolton Corporation	„ 12	2,547	2,503	— 44	50	133,304	— 266
Bournemouth Corp.	„ 15	1,870	1,802	— 68	50	104,251	+ 5,292
Bradford Corporation	„ 11	6,418	5,635	— 783	50	317,458	+ 12,323
Brighton Corporation	„ 12	835	807	— 28	49½	53,493	+ 1,073
Bristol	„ 10	8,518	8,622	+ 104	10	91,508	+ 7,498
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	„ 11	1,409	1,503	+ 94	50	79,637	+ 3,341
Burton-on-Trent Corp.	„ 12	254	235	— 19	50	14,106	— 456
Bury Corporation	„ 12	1,268	1,193	— 75	49½	66,361	+ 400
Cardiff Corporation	„ 4	2,461	2,569	+ 108	48	131,119	+ 1
Chatham & District	„ 9	996	975	— 21	10	10,226	+ 706
Chesterfield Corp.	„ 9	249	249	nil	49	13,207	+ 169
Colne Corporation	„ 4	227	233	+ 6	...	...	...
Cork Electric	„ 9	457	418	— 39	10	4,424	+ 122
Croydon Corporation	Feb. 25	1,551	1 470	— 81	47	85,706	+ 5,471
Derby Corporation	Mar. 11	936	956	+ 20	49¾	51,818	+ 2,434
Dover Corporation	„ 11	244	239	— 5	49	14,955	+ 2,311
Dublin & Lucan	„ 10	109	106	— 3	10	1,124	— 8
Dublin United	„ 10	5,441	5,539	+ 98	10	58,080	+ 4,134
Dundee City	„ 8	1,216	1,261	+ 45	42½	57,858	+ 3,654
East Ham Corporation	„ 11	1,237	1,115	— 122	49¾	64,755	+ 5,536
Exeter Corporation	„ 10	299	293	— 6	49	18,179	+ 1,021
Glasgow Corporation	„ 11	20,711	21,120	+ 409	41	889,131	+ 69,209
Glasgow Subway	„ 11	1,079	1,249	+ 170	10	12,634	+ 1,541
Glossop (U. Elec. Supp.)	„ 11	107	113	+ 6	11	1,410	+ 230
Halifax Corporation	„ 7	1,875	1,906	+ 31	48¾	106,639	+ 973
Do. Motor Omnibuses	„ 7	44	33	— 11	48½	2,325	— 43
Hastings & District	„ 10	707	649	— 58	10	7,157	+ 169
Huddersfield Corp.	„ 16	2,326	2,468	+ 142	49	131,651	+ 17,612
Hull Corporation	„ 11	3,088	3,164	+ 76	49	153,329	— 690
Ilford U.D.C.	„ 11	557	586	+ 29	49	31,785	+ 3,436
Ilkeston Corporation	„ 15	114	116	+ 2	50	6,699	+ 413
Ipswich Corporation	„ 11	363	445	+ 82	48	26,541	+ 4,766
Isle of Thanet	„ 11	234	203	— 31	23	5,783	— 1,008
Kilmarnock Corp.	„ 11	140	145	+ 5	43	7,192	+ 318
Lanarkshire	„ 9	1,747	2,032	+ 285	10	21,259	+ 3,786
Lancashire United	„ 8	1,579	1,563	— 16	10	15,654	+ 1,011
Leeds City	„ 11	8,056	8,431	+ 375	50	443,163	+ 36,706
Leicester Corporation	„ 11	2,820	3,077	+ 257	10	32,230	+ 4,276
Leith Corporation	„ 11	648	715	+ 67	43	32,979	+ 2,812
Leyton U.D.C.	„ 9	1,487	1,373	— 114	49	78,073	+ 8,782
Liverpool Corporation	„ 4	12,379	12,812	+ 433	9½	121,654	+ 8,445
Llandudno & Colwyn B.	„ 10	192	179	— 13	14½	2,682	+ 57
London County Council	„ 9	46,816	44,255	— 2,561	45	1,997,098	— 4,516
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	„ 11	143	114	— 29	22½	2,967	— 888
Maidstone Corporation	„ 9	163	155	— 8	49	10,426	+ 493
Manchester Corp.	„ 11	16,449	16,876	+ 427	49	880,359	+ 34,933
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	„ 11	152	184	+ 32	49½	9,633	+ 701
N'castle-on-Tyne Corp.	„ 11	5,795	5,483	— 312	50	304,815	+ 28,512
Newport (Mon.) Corp.	„ 11	741	782	+ 41	50	41,877	+ 2,090
New St. Helens & Dist.	„ 8	897	855	— 42	36	36,313	+ 3,498
Northampton Corp.	„ 10	660	632	— 28	49¾	35,469	+ 5,708
Nottingham Corp.	„ 9	3,308	3,566	+ 258	49	182,989	+ 14,652
Oldham Corporation	Feb. 6	2,001	2,148	+ 147	46	104,400	...
Portsmouth Corp.	Mar. 11	2,096	2,098	+ 2	50	120,528	...
Preston Corporation	„ 8	852	910	+ 58	49	48,015	+ 3,115
Provincial	„ 11	1,890	1,886	— 4	23½	47,316	+ 3,273
Reading Corporation	„ 9	647	711	+ 64	49½	38,726	+ 4,200
Rhondda Tramways	„ 2	952	1,124	+ 172	9	10,449	+ 962
Rochdale Corporation	„ 11	1,473	1,454	— 19	47½	83,236	+ 4,186
Rotherham Corp.	„ 15	987	1,173	+ 186	50	59,332	+ 8,542
Salford Corporation	„ 13	4,673	4,819	+ 146	49¾	257,473	+ 12,838
Sheffield Corporation	„ 12	8,182	9,060	+ 878	50¾	458,480	+ 64,969
Southampton Corp.	„ 8	1,174	1,386	+ 212	49	73,413	+ 8,958
Southend-on-Sea Corp.	„ 8	645	543	— 102	49	38,389	— 8,215
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	„ 4	668	734	+ 66	48¾	38,248	+ 2,014
Sunderland Corp.	„ 12	1,352	1,487	+ 135	50	74,846	+ 2,783
Sunderland District	„ 8	532	504	— 28	19	10,672	+ 903
Swindon Corporation	„ 8	159	167	+ 8	49	9,596	+ 885
Torquay Tramways	„ 2	347	363	+ 16	9	3,660	+ 249
Tyneside Trys. & Tmrds.	„ 8	518	461	— 57	10	4,808	— 86
Wallasey Corporation	„ 11	1,049	1,034	— 15	49¾	62,136	+ 1,656
Walsall Corporation	„ 11	660	672	+ 12	9	7,931	+ 1,103
Walthamstow U.D.C.	„ 11	706	731	+ 25	50	43,311	+ 4,097
Warrington Corp.	Feb. 24	414	481	+ 67	47	21,990	+ 1,470
West Ham Corporation	Mar. 9	2,819	2,842	+ 23	49½	151,301	+ 12,416
Wigan Corporation	„ 9	1,415	1,511	+ 96	49	74,706	+ 3,146
Wolverhampton Corp.	„ 15	1,037	1,051	+ 14	50	56,002	+ 3,513
Yorkshire (W. Riding)	„ 12	1,438	1,376	— 62	11	17,400	+ 1,804

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 16.] LONDON, SATURDAY, MARCH 25, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF SOUTH SHIELDS.

UNIFORM CLOTHING.

The Tramways Committee invite Tenders for the supply of Uniform Clothing for Inspectors, Motormen, Conductors (Male and Female) for the twelve months ending March, 1917.

Specification and Form of Tender, with conditions, may be obtained from Mr. J. C. Whiteley, General Manager, Dean Road, South Shields, at whose office samples of clothing may be inspected, and full information obtained.

Tenders, addressed to the Town Clerk at the Municipal Buildings, South Shields, and endorsed "Tender for Uniform Clothing" must be delivered at or before noon on the 14th day of April, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

J. MOORE HAYTON,
Town Clerk.

Municipal Buildings, South Shields.
March 22, 1916.

COUNTY BOROUGH OF SOUTHAMPTON.

TO CONTRACTORS AND OTHERS.

METERS.

The Corporation invite Tenders for the supply and delivery of British-made Meters for the Electricity Department during a period of twelve months.

Specification, Condition and Formof Tender may be obtained upon application to the Borough Electrical Engineer, Electricity Supply Station, Western Shore, Southampton.

Sealed tenders, endorsed "Tender for Meters," must be delivered at the Town Clerk's Office on or before the 8th proximo.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE.
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton.
March 21, 1916.

URBAN DISTRICT OF BRAY.

TENDERS FOR GENERAL STORES, AND FOR STORES REQUIRED AT COUNCIL'S ELECTRIC LIGHT WORKS.

Notice is hereby given that the Bray Urban District Council will, at their meeting to be held in the Town Hall, Bray, at 8 p.m. on Tuesday, April 4, 1916, be prepared to receive and consider Tenders for supply of general stores and stores required at Council's Electric Light Works, which are fully described in schedules, copy of which will be forwarded, together with form of tender, on application to the undersigned.

The Council do not bind themselves to accept the lowest or any tender.

Tenders must be on the prescribed form, and be delivered to undersigned, properly sealed and endorsed on cover, "Tender for General" or "Electric Light" stores, as the case may be, not later than date and hour above mentioned.

By order,
D. MULLALLY,
Clerk to the Council.

Town Hall, Bray.
March 15, 1916.

COUNTY BOROUGH OF BURNLEY.

TRAMWAYS DEPARTMENT.

The Corporation invite Tenders for the supply of Uniforms for one year commencing April 1, 1916, for Drivers, Conductors, Inspectors, etc.

Particulars and Forms of Tender may be obtained from Mr. Henry Mozley, General Manager, Queen's Gate, Burnley.

Tenders, addressed to "The Chairman, Tramways Committee, Town Hall, Burnley," and endorsed "Uniforms," to be left at my office not later than Tuesday, March 28, 1916, at 10 a.m.

The Committee do not bind themselves to accept the lowest or any tender.

PEREGRINE THOMAS,
Town Clerk.

Town Hall, Burnley.
March 7, 1916.

REDDITCH URBAN DISTRICT COUNCIL.

ELECTRIC SUPPLY DEPARTMENT.

The Council invite Tenders for the supply of 125 tons of D.S. Nuts per week for the three months ending June 30, also for six months ending September 30, in trucks to Redditch Railway Station.

Sealed Tenders are to be addressed to the undersigned and endorsed "Tender for Coal," to be received not later than March 28, 1916.

The Council do not bind themselves to accept the lowest or any tender.

R. N. MAYNE,
Chief Engineer.

Electricity Works, Redditch, Worcestershire.

THE SOUTH INDIAN RAILWAY COMPANY, LIMITED.

The South Indian Railway Company, Limited, are prepared to receive Tenders for the supply of—

QUILON-TRIVANDRUM BRANCH (Metre Gauge).

No. 1. Rolling Stock—
- 10 Steel Covered Goods Bogie Wagons.
- 7 Steel High-sided Bogie Wagons.
- 5 Steel Ballast Wagons.
- 3 Underframes for Combined Brake Van and Horse-boxes.

No. 2. Laminated Volute, and Helical Springs.

Specifications and Forms of Tender may be obtained at the Company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Co., Ltd., marked "Tender for Rolling Stock," or as the case may be, must be left at the offices of the Company not later than one o'clock on Wednesday, the 29th instant.

The Company is not bound to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 20s. for each copy of Specification No. 1 and 10s. for each copy of Specification No. 2.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M Inst. C.E., Consulting Engineer to the Company, 3, Victoria Street, S.W.

91, York Street, Westminster, S.W.
March 14, 1916.

POSITIONS VACANT.

COUNTY BOROUGH OF WEST HARTLEPOOL.

TEMPORARY ASSISTANT IN BOROUGH ENGINEER'S DEPARTMENT.

Applications are invited for the appointment of a Temporary Assistant in the Borough Engineer's Department. Applicants must be good draughtsmen, with a thorough knowledge of surveying, levelling, building and drainage inspection and the general work of an engineer's and surveyor's department. Salary at the rate of £110 per annum.

Applications, marked "Temporary Assistant," stating age, experience and qualifications, together with copies of two recent testimonials, and naming the earliest date on which applicant can take up duties, if appointed, must be forwarded to the undersigned not later than Monday, April 3, 1916.

NELSON F. DENNIS, M.Inst.C.E.
Borough Engineer and Surveyor.

Borough Engineer's Department, Municipal Buildings,
March 16, 1916.

Digitized by Google

SWITCHBOARD ATTENDANT.

Switchboard Attendant required for combined three-wire lighting and traction supply station. Experience in three-phase generation a recommendation, but not essential. Wages, 35*s.* per week, rising yearly 2*s.* 6*d.* per week to 40*s.* Only applications from persons whose present employers are willing to release them will be considered. Write, stating age, experience, and enclose copies of not more than two recent testimonials, to Mr. G. R. Spurr, Electrical and Tramways Engineer, Priory Avenue, Walthamstow.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 3488 Leeds. MATERIAL AND SUPPLIES

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.
Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

DOCKERS' SUPERFINE PAINTS
and
EXTRA DURABLE VARNISHES
for
TRAMCARS.

DOCKERS' "HERMATOR" PAINTS AND ENAMELS
for
POLES AND POWER STATIONS.
Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

COMPARATIVE TRAMWAY ACCOUNTS.

The latest Municipal Tramway Accounts are summarised in

THE TRAMWAY AND RAILWAY WORLD
OF MARCH 9, 1916.

The capital and working reports are clearly and systematically arranged so that any required fact can be readily ascertained, while comparisons of results of the different systems can easily be made.

Particulars are given under the following heads:—

Capital Account :—
Borrowing Powers.
Borrowing Powers Exercised.
Unexhausted Borrowing Powers.
Capital Expenditure per mile of Single Track.
Loans Outstanding.
Sinking Fund and Loans Repaid.
Depreciation, Renewal and Reserve Funds.

Gross Receipts :—
Traffic.
Other Revenue.
Total.

Working Expenses :—
Traffic.
General.
Repairs and Maintenance.
Power.
Total.

Gross Profit on Working.

Reductions from Gross Profit :—
Interest.
Sinking Fund.
Income Tax.
Depreciation and Renewals.
Sundries.
Total.

Net Surplus or Deficit.

Appropriation of Net Surplus :—
Carried Forward.
Reserve.
Relief of Rates.

Percentage of Operating Expenses to Total Revenue.

Receipts per Car Mile :—
Average Total per Car Mile.
Average Traffic Total per Car Mile.

Operating Expenses per Car Mile :—
Traffic.
General.
Repairs and Maintenance.
Power.
Total.

Average Operating Expenses per Car Mile (excluding Power Cost).

Energy Consumption :—
No. of B. of T. Units used.
Cost per Unit.
Units used per Car Mile.

Traffic Records :—
Population served.
Car Mileage.
Passengers Carried.
Passengers Carried per Car Mile.
Average Fare per passenger.
Average Journeys per head of population served per annum.
Average Car Miles per day per Car.
Traffic Revenue per Mile of Single Track.
Average Traffic Revenue per annum per head of population served.
Operating expenses per passenger.
Average distance of 1d. fare.
Average fare charged per mile.
Average speed per hour.
Average Car hours per day.
Average number of Cars in use daily.
Number of Cars in stock.

Digitized by Google

THE
Tramway AND Railway World
Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MARCH 25th, 1916.

THE SHORTAGE OF DRIVERS.

The increasing difficulty of obtaining drivers is naturally causing much disquietude in the mind of officials of omnibus and tramway undertakings, but with a war of such magnitude the contingency of a failure in the supply must be faced. There are rumours that a large omnibus company already recognises the possibility of having either to suspend necessary services or to employ women as drivers. Doubtless there will be great difficulty in finding women who are willing and capable of receiving instruction in the driving of the omnibuses in streets beset with dangers, but for months past women drivers have driven numerous light commercial motors and horse vehicles. In contrast to the driving of omnibuses, the employment of women as tramcar drivers appears to be a matter of comparatively little difficulty, if we may judge by the reported success of lightly-built women who have accomplished the task in two or three provincial towns. The same remark is applicable to Glasgow, where during the past six months thirty-three women have been trained, following an experiment with five women drivers. In the Scottish city the innovation has proved sufficiently successful to warrant the Tramways Committee in advising the Corporation to permit of the further employment of women drivers in an effort to maintain the present service. Time alone will show whether women are capable of enduring the strain that must result from even short periods of duty. Still, there are several reasons to warrant managers giving serious attention to what has been accomplished at Glasgow, for the civil requirements of the nation will have to be made entirely subordinate to the demands of the military advisers of the Government. Evidence is accumulating that those demands are likely to increase. For instance, it is reported that the authorities are now considering whether to raise the military age from forty-one years to forty-five, or to advise an extension of compulsory service to all married men below forty-one. Whichever course is adopted traction undertakings will certainly be affected thereby. The second mentioned procedure would launch both tramways and omnibus managers into a sea of difficulty if no more regard is paid to their representations at the local tribunals than has been the case in reference to the unmarried motormen of military age. Temporary exemption only is being granted for the purpose of enabling substitutes to be found. At first the inclusion of traffic undertakings in the list of reserved industries prevented a man from enlisting without the sanction of his employers, but the amended regulations only allow of bachelor drivers being exempted at the discretion of the military adviser to the tribunal. It is plain therefore that a manager can be sure of retaining none but drivers engaged upon those portions of the tramways that serve munition manufacturing districts. That the military age may be raised in lieu of compulsion for married men is exceedingly probable, in which case there will be a diminution in the number of available men from whose ranks several undertakings have obtained volunteer motormen. Managers would have been well advised if they had generally adopted the plan of using these voluntary workers, who have proved successful at Newcastle, Birmingham, and Portsmouth. The longer the war lasts the greater will be the difficulty in obtaining their services and especially in training them. Apart from women there is only one other source from which drivers may be secured, viz., youths of seventeen years of age, provided that there are no war industries offering higher wages. A number of tramway and omnibus companies are employing them in the hope that the war will be over before they can reach the age of nineteen and be taken for military service.

APPLICATIONS TO TRIBUNALS.

At the County of Renfrew Tribunal, under the Military Service Act, Major F. Coutts, manager of Paisley District Tramways Company, appealed for total exemption of thirteen motormen, whom he considered indispensable on account of the large number of munition workers carried in the cars night and morning. Between 8,000 and 10,000 munition workers used the cars daily, and on account of the scarcity of houses, the workmen could not move their residences from one place to another. It was an absolute necessity to maintain the tramway service. If the company lost these motormen it would mean the withdrawal of the cars. Between fifty and sixty per cent. of the company's workers had already either enlisted or been called up, and the staff had been reduced from 230 to 120. Women conductors and boys had been introduced, and the company were also willing to take on partially disabled soldiers if qualified for the work. The Court granted exemption as long as the men remain in the company's employment, the military authorities to deal on similar lines with other cases as they arose up to the number of sixty-two. As the thirteen men had been attested and had received 2*s.* 9*d.* each, the Sheriff said they ought to return the money to the Government. Major Coutts agreed with that view.

The Town Clerk of Chester applied to the local Tribunal for the exemption of a tramway inspector and three motormen. He said, according to the certified list of occupations, these men were exempt from service, but it was necessary to appear before the Tribunal in order to get the certificate.

Judge Moss: Have you tried to replace them?

The Town Clerk said the drivers were single men. With regard to the inspector, he withdrew the claim for exemption. They could not replace the drivers at once, but the Tramways Committee had given instructions to the traffic manager to try and get men ineligible for service to take their places. He had informed the military authorities that if they could find men discharged from the army physically capable of taking charge of a tramcar, they would train them for the work.

The Tribunal granted a temporary certificate for fourteen days, Judge Moss pointing out that they would have two months after that.

Temporary exemption was granted to four motor omnibus drivers in the employ of the Sheerness and District Electric Power and Traction Company, in order to allow the manager to train discharged soldiers to take their places. The manager, in reply to a suggestion that women could be employed, stated that women tramcar and omnibus drivers could not stand bad weather, and after about three days' work had to go on the sick list.

Southampton Corporation Tramways have received a certificate from the Minister of Munitions constituting them a controlled establishment under the Munitions Act, 1915.

Digitized by Google

ERITH OMNIBUS SCHEME WITHDRAWN.

ARRANGEMENT WITH THE L.G.O. TO AVERT COMPETITION.

At a special meeting of Erith Urban Council in Committee, consideration was given to the appended correspondence from the Ministry of Munitions relating to the recently instituted London General Omnibus Company's service to munition works in the district. It transpired that the omnibuses came to Erith in the first place by permission of one department of the Ministry, but when it was found that they competed with the Council's tramways, a conference of officials was held, and the terms mentioned below were settled. It will be seen that whilst the present service of omnibuses will end at St. Augustine's Church, Belvedere, a new route will be covered to serve Higher Belvedere, and another opened between Erith and Crayford.

WHITEHALL, S.W.
March 10, 1916.

The Clerk to the Urban District Council, Erith.

DEAR SIR,—I beg to refer to your letter of February 8, regarding the service of motor omnibuses which has been started by the London General Omnibus Company between Woolwich and Erith, along your Council's tramway route.

The Minister is anxious to prevent overlapping and waste of energy, and has considered the most effective method of co-ordinating your tramway service with the service of the London General Omnibus Company. He appreciates the public-spirited action taken in the past by your Council in connection with the tramway service at Erith, and is desirous that, with due regard to the paramount importance of providing the fullest possible facilities for the conveyance of munition workers, any settlement arrived at should give full consideration to the claims of the Urban District Council.

The following terms are now proposed as a settlement of the matter :—

1. The London General Omnibus Co. should restrict their service of omnibuses now running in competition with the Erith Council's tramways by terminating this service at St. Augustine's Church, it being understood :
   (*a*) that the Council will assist as far as they can at the terminal point in providing the necessary turning and standing facilities ;
   (*b*) that the London General Omnibus Co. will so adjust their fares as to minimise all possibility of local competition with the tramways ;
   (*c*) that in the event of the service still being found to be competitive with the Erith tramways, the Omnibus Company will reduce the present all-day service to a "rush hour" service only.
2. The London General Omnibus Co. should provide an omnibus service (to the reasonable satisfaction of the Ministry of Munitions) between Woolwich and Erith, via Bostall Heath, West Heath, and Upper Belvedere, Friday Hill, and Fraser Road, which route is not at present provided with transit facilities.
3. The London General Omnibus Co. should provide an omnibus service (to the reasonable satisfaction of the Ministry of Munitions) between Erith and Crayford, via North End, to meet the requirements of Messrs. Vickers' workers between Crayford and Erith.
4. The Erith Council should, if necessary, run a full service of tramcars during the "rush hours," employing for this purpose the maximum number of cars which they may have available.
5. The Erith Council should agree to withdraw their application for the Provisional Order, which, if issued, will enable them to run motor omnibuses.

I venture to express the hope that the terms here suggested will receive the approval of your Council, and shall be happy to hear from you after you have had an opportunity of submitting the matter to them,

Yours faithfully,
(*Signed*) R. L WEDGEWOOD, Director of Munitions Railway Transport.

The terms set forth in the correspondence were agreed to by the Council, who were advised that any infringement of the conditions by the Omnibus Company would release the Council from their part of the obligation, and would enable them to proceed with their application for powers to run omnibuses. One result of the agreement is that the company's vehicles are diverted to a road entirely maintained by Kent County Council. The latter authority had decided to oppose the Urban Council's application unless they agreed to pay them ½*d.* per car mile. The London County Council had also demanded a contribution towards road maintenance, besides a financial adjustment as regards routes competing with their tramways. There is now to be unconditional operation of omnibuses over the roads of the two county authorities.

MOTOR VEHICLES FOR MUNICIPALITIES.

Sheffield Tramways Committee have authorised the inauguration of a motor omnibus service between Firth Park tramway terminus and Ecclesfield. This step completes, we believe, the work of providing every main road out of the city with a means of public conveyance beyond the tramway terminus. The tramways department had for some time been engaged in arranging this system of feeders, and the work has been hastened in some localities in order to meet the needs of munition workers. Considerable additions remain to be made to the various services before the maximum amount of traffic is reached, but owing to the difficulty of obtaining vehicles (unless required for the conveyance of war workers), it will probably not be possible to take the task fully in hand until the war has ended. Including an additional chassis that has been ordered at a cost of £865, the Tramways Department are now working twenty-two omnibuses, but there is scope for at least forty-five such vehicles. The body for the new vehicle is being constructed in the tramway workshop, and the cost of the complete conveyance is to be charged to the motor omnibus reserve fund.

West Bridford Urban Council have completed negotiations for the purchase of a seventh motor omnibus.

Newcastle Corporation have arranged to purchase an electric wagon for the collection of house refuse.

Kensington Council recently ordered a coke fuel motor chassis, but the National Steam Car Company are unable to execute the order, owing to the large amount of work that they have in hand. The Council therefore propose to purchase a 3½-ton Napier chassis.

Sheffield Health Committee have placed an order with Edison Accumulators, Ltd., for a third electric vehicle, at a cost of £1,000, for the collection of house refuse.

Glasgow Corporation Motor Car Central Garage Committee have offered the Finance Committee £75 for each of the two Ford cars used in connection with the raising and equipping of the Corporation battalions for service in France.

Grimsby Council have received sanction to the borrowing of £1,200 for the purchase of a motor fire engine.

L.C.C. TRAMWAY MATTERS.

A meeting of the London County Council was held on Tuesday last, when the following reports were presented in connection with the Tramways Department.

HIGHWAYS COMMITTEE OFFICERS.

Mr. G. H. Hume has been appointed chairman, and Captain Theodore Prestige vice-chairman of the Highways Committee. The former has been elected as the representative of the Highways Committee on the General Purposes Committee, and Mr. D. Davies as the representative of the Highways Committee on the Stores and Contracts Committee.

INCREASED INCOME TAX.

Owing to the increased rate of income tax for the current financial year, the provision of £42,000 in the maintenance vote in respect of the tax on the tramways service will be insufficient by about £3,000, and a supplemental estimate of this amount was agreed to on the recommendation of the Finance Committee as chargeable to maintenance account.

EMPLOYMENT OF MARRIED WOMEN.

The Council of November 23, 1915, decided that women should be employed as conductors on the tramways and at the central car repair depot on work of an unskilled character in connection with repairs to tramcars during the period of the war, and thereafter so long as the conditions remain abnormal. Under the Council's regulations married women may not be employed, but the Highways Committee recommended the employment of married women be authorised during the continuance of existing conditions.

All tramway reports were adopted.

NEGOTIATIONS WITH THE ALLIED COMPANIES.

Mr. W. C. JOHNSON (Whitechapel) asked (1) if the negotiations with the London General Omnibus Company with a view to a mutual arrangement for preventing the duplication of passenger traffic services in London were still in progress; and (2) if so, had the Council been in any way committed.

Mr. G. H. HUME (chairman of the Highways Committee) replied (1) in the affirmative, and (2) in the negative.

Mr. JOHNSON asked if they were to understand that the Council would not directly or even by implication be in any way committed in the negotiations.

Mr. HUME answered that it would be the care of the Highways Committee not to commit the Council.

ELECTRIC VEHICLE PROGRESS.

Less than three years have passed since a serious attempt was made to forward the sale of battery vehicles in this country, but from the March quarterly issue of the "Electric Vehicle," the official organ of the Electric Vehicle Association, we learn that the total number of such machines now in use, or on order is 678. Two years ago there were only 150. From a report issued by the Bureau of Census, Washington, we are able to compare British progress with that of the United States. The document shows that during the year 1914 the number of electric battery vehicles constructed was 4,715. This total is an increase of 22.9 per cent. on the output in 1909. Of course many of the cars in use in Great Britain are imported from the States, the war having in some respects interfered with the introduction of the electric vehicle, while assisting it in other directions. The British rate of increase is therefore exceedingly encouraging. Among the largest users are Harrods, Ltd. (London), who run seventy vehicles, Midland Railway 27, Great Western Railway 19, London and North-Western Railway 12, Lancashire and Yorkshire Railway 5. Four omnibuses each are being run by York and West Bromwich Corporations, two by South Shields Council, and one by Southend Council. Electric tower wagons are in use on the Ilford, Derby, Belfast, and Southampton Tramways. For cleansing, dust removal, ambulance, fire brigade, and haulage work, twenty-nine chassis are utilised by the Blackburn, Blackpool, Bury, Dover, Smethwick, Heston, Ipswich, City of London, Rathmines, Birmingham, Liverpool, Nottingham, Sheffield, and Wolverhampton local authorities, while twenty-three councils have adopted them in connection with their electric supply undertakings. Sixteen are being operated by Brighton Omnibus Company and five by Loughborough Omnibus Company. Ten are engaged at the Daimler Works, Coventry, and nine 3½-ton lorries at the factories of Vickers, Ltd. There are a number of informative articles in this issue of the journal, including the first instalment of an article headed "The Choice of an Electric Vehicle." This has been penned in consequence of the numerous inquiries that are received by the Electric Vehicle Committee. Another article gives particulars and illustrations of the "Ingranic" switchboard section for the charging of batteries. This system makes it possible to begin with equipment for charging one vehicle and to build up step by step until the installation is large enough to cope with hundreds of vehicles.

WOMEN TRAMCAR DRIVERS.

Wigan Watch Committee have granted licences for three women drivers on the Corporation tramcars and seventeen women conductors, on the application of Mr. F. Buckley, the tramways manager. Alderman R. T. Fletcher, chairman of the Watch and Tramways Committees, observed that the manager was strongly of opinon that the women for whom licences were being sought would be very suitable to act as drivers. The manager had been successful in getting seventy-four men starred as being indispensable, but the military representative expected the Tramways Committee would do what

Digitized by Google

they could to take on men of non-military age or discharged military men in order to release other men for service. Alderman O'Donahue said he had seen women driving in Glasgow, and they were giving satisfaction. The chairman remarked that the manager proposed to employ them on the Martland Bridge route, where the road was fairly flat. Before they were instructed in driving it was necessary that they should be granted licences.

Ashton-under-Lyne and District Trades Council have protested against a suggestion for the Stalybridge Tramways Board to employ women as drivers.

THE L.G.O. TRAINING SCHOOL.

The London General Omnibus Company have for the past two years maintained a well-equipped school for motor omnibus drivers and conductors, where all new drivers are trained for an average period of 28 days and conductors for 14 days. In order that the public might be given some idea of the thorough way in which the training is carried out, the company invited representatives of the Press to inspect the school on Wednesday, when the usual class-room work was proceeding. The training school is situated in Milman Street, Chelsea, and occupies some 31,050 square feet, including an open yard in which various dummy refuges, pedestals, etc., are placed, and are used in the instruction and practice of drivers. Within the building are five class-rooms, a cinema hall, and a mess-room, in which food is provided at cost price to learners. Adjoining the school is the clothing store, the headquarters of the clothing department of the company, where all uniforms for the 10,000 drivers, conductors, and inspectors are dealt with.

The training of the drivers is systematic and thorough. After a strict medical examination, particularly in regard to sight and hearing, the men begin their instruction in the drivers' rooms, in which there are various parts of the omnibus chassis, including an actual section through one of the engines. Here the drivers obtain practical knowledge of the mechanical equipment, and are taught to remedy small defects. They then attend lectures in the cinema hall, where educational films illustrating their work are shown. These films reproduce the actual conditions of service working, and embrace almost every conceivable emergency that drivers meet in their daily work. Special emphasis is laid on the importance of the rule of "safety first." Points in connection with the avoidance of accidents are given by the lecturer in such a way as to impress the memory of the men and to arouse in them a strong sense of their responsibility to the public. They are told repeatedly that "it is the wish of the company" that the safety and convenience of passengers should stand first. With the lectures is given practical training in gear-changing and general control of the vehicles. Then comes instruction in driving in the school premises, which is followed by practice in quiet neighbourhoods. Subsequently the learners are gradually accustomed to traffic conditions in busier thoroughfares. Finally they are tested by one of the chief instructors, and are then submitted to the Scotland Yard police test.

Conductors have also to undergo systematic instruction at the training school. They also attend lectures on tickets, the avoidance of accidents, and on general traffic work. Special cinematographic films have been prepared for them and special importance is attached to the "safety first" instruction.

During the past few months large numbers of women conductors have been trained, and their work since they have been put on the omnibuses is proving very satisfactory.

Mr. H. E. Blain, the operating manager of the London General Omnibus Company and the Underground Railways, presiding at a luncheon which followed the inspection, gave a very interesting account of the part the company had taken in assisting the mobilisation on the outbreak of war, and described the great difficulty of maintaining the services owing to the rapid departure of the men to join the Forces. On some occasions it was impossible to determine before midnight what services could be run the following day, as the number of men that would be available could not be ascertained earlier. Among other memorable feats was the dispatch on a few hours' notice of 300 omnibuses on the ill-fated Antwerp expedition with drivers fully equipped for the expedition. Since the war began more than 5,300 drivers and conductors have joined the Forces, and 3,019 have attested. That the company have been able to maintain such excellent services is a striking testimony to the efficiency with which the London General Omnibus Company is managed.

SALE OF SWANSEA TRAMWAY STATION.

Swansea Corporation have concluded an arrangement to take over the power station of the Tramways Company and to supply them with the whole of the energy they require, instead of only one-fourth as at present.

The existing supply of about 500,000 units is given on the following scale:—First 200,000 units, $1\frac{1}{4}d.$ per unit; next 150,000 units, $1\frac{3}{16}d.$; next 150,000 units, $1\frac{1}{8}d.$; next 150,000 units, $1\frac{1}{16}d.$; and the next 150,000 units, $1d.$ per unit; to be supplemented as follows, viz.:—The next 200,000 units, $\frac{3}{4}d.$ per unit; for all units in excess of 1,000,000 taken in any one year, $\frac{1}{2}d.$ per unit; all such electrical energy to be delivered into the company's existing feeder cables.

Under the new arrangement the average price paid by the company for energy under the foregoing scale is subject to a coal clause, the price rising when the cost of coal to the Corporation exceeds 16s. per ton, and falling when the price falls below 15s. per ton. The Company are to hand over their power station, as it at present exists, to the Corporation, free of ground rent, to be held by the Corporation as their own property, and in consideration the Corporation agree to pay the Company the sum of £400 per annum for 26 years.

The electrical engineer estimates that the cost of giving effect to the arrangement will be £2,000, but that there will be an extra profit of £1,200 a year. At present the machinery supplying the company was run very uneconomically, but the extra units would be generated at a lower cost. The present profit was £800 per annum. In the course of the discussion, the Mayor said the offer was the company's final one. It was also stated that the tramways would not pass over to the Corporation until 26 years had elapsed.

MISCELLANEOUS NEWS AND NOTES.

Additional Plant at Sheffield.—Sanction has been received to the borrowing of £111,642 for providing additional plant at Neepsend power station.

Volunteer Motormen.—Good work is being done by the volunteer motormen who have been trained on the Birmingham Corporation Tramways during the past three months. At present they are employed on Sundays.

Edinburgh Tramways.—The interruptions to the cable tramways have now greatly decreased. In Lothian Road the track is being reconstructed, and the company also intend to renew the London Road track.

The Old Fare Collecting Boxes.—In the event of the restricted importation of pulp resulting in a shortage of tramway tickets, it is proposed to re-introduce the fare collecting boxes on the Colchester tramcars.

Institution of Electrical Engineers.—At a meeting to be held on April 13 a discussion will take place on "The present position of the Electricity Supply in the United Kingdom, and the steps to be taken to improve and strengthen it after the War."

Great Orme Tramways Company and Sunday Running.—For the second time the shareholders of this company, at a meeting held on March 20, passed a resolution instructing the directors to apply to the Llandudno Council for permission to run the cars on Sunday afternoons.

Tramcar Truck for Haulage Work.—In lieu of purchasing an electric tractor at a cost of £480, Southport Electricity Committee have purchased a tramcar truck from the Tramways Committee for £375. It is to be used for haulage work at Crowlands power station.

Fares Raised in Germany.—Representatives of the principal tramway undertakings in Germany have met at Berlin to consider the question of fares in relation to the great increase in the cost of maintaining the lines. It was decided to issue a national notice to the effect that nothing short of an increase of $1d.$ fares to $1\frac{1}{2}d.$ would enable the services to be continued on the present schedules.

Brighton Employees' Patriotism.—Councillor Martin, chairman of Brighton Corporation Tramways Committee, informed the Council on March 16 that more men had enlisted from the tramways than from any other Corporation department, and he believed the number was larger, relatively speaking, than from any other tramway undertaking in the whole country.

Thermit, Limited.—Owing to the extension of their manufactures and in view of centralising their business, the registered offices of Thermit, Limited, have been removed to commodious new premises recently erected at their works, 675, Commercial Road, London, E., to which address all communications should be sent. The telephone number is East 4157.

High Speed Steel Scrap.—The Ministry of Munitions have made arrangements whereby the makers of high speed steel will take back all scrap, short ends, etc., at uniform prices. The prices which have been fixed are 5d. per lb. for turnings, 6d. per lb. for bar ends delivered at steelmakers' works. It is illegal to dispose of high speed steel through any but authorised channels.

Manchester and Motor Lorry Traffic.—Commenting on the Manchester proposal to restrict motor-lorry traffic to the sides of the streets in which the tramways are laid, the "Commercial Motor" says:—"We can conceive that in certain thoroughfares in Manchester the interests of all parties will be better served by some arrangement of the kind, subject to due safeguards."

The Height of Absurdity.—A ratepayers' association at Finchley have had the hardihood to suggest to the Metropolitan Electric Tramways Company that halfpenny fares should be instituted. The company's reply has not yet been made public, but we can imagine its forceful nature in these days of greatly increased working expenses.

Birmingham Motor Omnibus Company.—It was stated in our issue of March 9 that this company had arranged to run a service of motor omnibuses into Lichfield on the same conditions as to road maintenance, etc., as prevailed in the districts affected by the Walsall Corporation Act. We learn, however, that while the licences were offered on those conditions, the company have not taken them up, nor do they intend to do so.

Tramway Scheme for Formosa.—A company has been formed to construct an electric tramway from Tainan to Auping Port, Formosa, a distance of three miles. Owing to the scarcity of steel due to the war, it is probable that the rails of an existing light railway connecting the two places will be utilised. The name and address of the company may be ascertained on application to the city branch of the Board of Trade, 73, Basinghall Street, E.C.

Notice to Forgetful Passengers.—Notices have been posted in the Newcastle cars warning passengers that they are responsible for paying the fare, and that the penalty for non-payment is 40s. Observation is being kept upon workmen who leave cars en route without tendering the fare. Proceedings will be taken against offenders. It is claimed that there is no excuse for workmen, as they can provide themselves with books of weekly coupons.

Iron, Steel, and Engineering Industries.—A committee has been appointed by the President of the Board of Trade to consider the

Digitized by Google

position of the iron, steel, and engineering industries after the war, especially in relation to international competition, and to report what measures may be necessary or desirable in order to safeguard that position. The Committee will comprise Sir C. Hyde (chairman), Mr. A. Balfour, Sir H. Bell, Mr. A. J. Hobson, Sir H. Rogers, and Mr. D. Vickers.

Headlights in Rural Districts.—In awarding £22 damages against Wemyss and District Tramways Company in respect to loss of sheep, due to a collision, the Kirkcaldy Sheriff said the cars ran chiefly through country districts, and it seemed open to question whether one headlight about ten or twelve feet from the ground, even of sixteen candle-power, was sufficient to give the driver a proper view of the road in front of him from side to side. Apparently it only illuminated the car track for about fourteen yards ahead, and left the sides of the road in darkness.

No Contracts with Enemies.—Many local authorities have already adopted the following resolution passed by Manchester Corporation: "No contract shall be entered into with any person of German or Austrian nationality. No contract shall be entered into with any firm or company whose subscribed capital (whether by way of shares or otherwise) is held or controlled to the extent of one-third or upwards by persons of German or Austrian nationality. Cardiff Council have added an addendum that the prohibition should include all agents and representatives of German and Austrian firms.

Burnley Electricity Works.—New generating plant, supplied by the British Westinghouse Company at a cost of over £26,000, was inaugurated on March 4 at the electricity works and at the Holmby Street sub-station. At the generating station a 2,000 kw. Westinghouse turbo-generator was started. The equipment at the sub-station includes two 600 kw. rotary converters and transformers for supplying energy for traction and other use, the voltage of the power received from the generating station being 6,600. With steam of 160 lbs. pressure the new turbo-alternator runs at a speed of 3,000 revolutions per minute, and it is capable of developing 25 per cent. continuous overload for two hours.

Employees' Wages.—Belfast Tramways Committee propose to substitute in lieu of the present bonus to their employees a bonus at the rate of three shillings per week to those in receipt of thirty shillings a week and under, and two shillings a week to those with over thirty shillings a week and under forty shillings. As the result of a conference between representatives of the Brighton tramways employees and the Tramways Committee, the employees' remuneration has been increased to an extent that will entail an outlay of £820 a year with the present staff. No man's full-time wage will be less than twenty-seven shillings and sixpence per week. The London electric railway workers have been granted a further advance of two shillings per week to bring their war increase into line with the concessions granted some time ago to railway servants generally. The men have now obtained increases of five shillings per week since the war began.

Coal and Lighting Supply.—At the general meeting of the County of London Electric Supply Company, Ltd., on March 13, Mr. H. B. Renwick (chairman) said that the coal question was still a matter for serious concern, not only from the point of view of price, which was about fifty per cent. above the 1914 prices, but also in regard to the difficulty in maintaining proper stocks. The company's normal supplies of coal were sea-borne, and the cost of freight alone was more than the cost in pre-war times of the coal itself delivered into the bunkers. It was time public action was taken to deal with the matter on lines similar to the recent Act determining the maximum price of coal at the pit's mouth, or by constituting a board of control similar in duties to the Railway Executive Committee. The thanks of the company were due to Mr. C. P. Sparks, the engineer-in-chief, on whom a great burden had been thrown by the coal question.

New Bonus Scheme at Newport.—Three years ago meters were placed on the cars and a bonus of £1 per annum has been paid to motormen who prove to be most economical in the use of power. In addition, those who are free from blameable accidents have received 5s. per quarter. A considerable saving in power has been effected in excess of the sum of £57 paid per annum as meter bonuses. A scheme has now been presented by Messrs. N. J. Young and A. Nichols Moore, general manager and electrical engineer respectively, to meet the objection that the driver who made the least number of stops, and so carried the lightest loads, has a better chance of earning the bonus than the man who looked out for and stopped to pick up passengers. The new scheme will include conductors (who had not hitherto participated in the bonuses) at an annual cost to the undertaking of £130. To motormen under Scale A a bonus of 7s. 6d. per quarter will be paid; under Scale B, 5s.; to conductors under Scale C, 5s. The bonus to be earned and paid for in compliance with the following conditions: (a) Civility and observance of intending passengers; (b) Cleanliness of person and uniform; (c) Good time-keeping; (d) Freedom from blameable accidents; (e) Careful observance of rules and regulations.

PERSONAL.

Mr. P. P. Wheelwright, electrical engineer, Blackburn Corporation Tramways and Electricity Departments, has been granted an increase in salary from £700 to £800.

Mr. D. Macfarlane Macleod has been appointed chief engineer to the Clyde Valley Electrical Power Company, after six years' service as resident engineer.

Mr. W. A. Scott, works manager of Bruce Peebles & Co., Ltd., of Edinburgh, has been presented with a canteen of cutlery and a silver cigarette-case by the workmen and staff, on the occasion of his marriage to Miss A. Mann, of Edinburgh.

Mr. E. J. Walsh, chief assistant engineer at Kilmarnock Corporation electricity works, has been appointed resident engineer to Musselburgh and District Electric Light and Tramways Company. The Kilmarnock employees have presented him with a purse of sovereigns.

Mr. David James, manager of the Swansea Improvements and Tramways Company, and the South Wales Transport Company, Ltd., is a member of the Appeals Tribunal under the Military Service Act for Glamorgan, and the county boroughs of Swansea, Cardiff, and Merthyr.

Mr. A. H. Seabrook, owing to his work in connection with the supply of munitions, has been obliged temporarily to relinquish the honorary editorship of the "Electric Vehicle." Communications on editorial matters should therefore be addressed to Mr. F. Ayton, the acting honorary editor, engineer and manager, Ipswich Corporation Electric Supply and Tramways Departments.

Sir Guy Granet, general manager, Midland Railway, has temporarily been appointed to act in an honorary capacity as controller of a new department termed the Department of Import Restrictions. It has been formed by the Government to give effect to the prohibition or restriction of imports of certain goods to meet the present and apprehended deficiency of tonnage. The office of the department is at 64, Victoria Street, S.W.

Sergeant E. Collard, who, at the outbreak of the war, was recalled to the 1st Notts and Derbyshire Regiment, from the London County Council Tramways, has been awarded the D.C.M. for carrying a message from the supports to the firing line under heavy fire. Although wounded he delivered the message and returned with a reply. He took part in the fighting at Mons, on the Marne, the Aisne, and at Ypres.

Mr. Gerald N. Murphy, son of Mr. W. M. Murphy, managing director, Dublin United Tramways, has been appointed a director of Dublin & Lucan Electric Railway Company, to fill a vacancy caused by the death of Captain Vesey. At the annual meeting Mr. J. W. Hill, the chairman, said the directors were sure that Mr. Murphy's experience of tramway and railway work would greatly assist them.

Mr. E. D. Fitzmaurice was presented, at the offices of the British Electrical Federation, with an inscribed gold watch on leaving to take up a post as permanent way engineer to the Cape Electric Tramways, Limited. Mr. Fitzmaurice, who received his training in the railway world, joined the engineering staff of the British Electrical Traction Company about fourteen years ago a assistant permanent way engineer. Later he became the permanent way engineer, and on the formation of the Federation transferred his services in a similar capacity to that body. The presentation was made by Mr. Emile Garcke on behalf of the directors, staff and many of the managers of the associated undertakings. Mr. Fitzmaurice was a very popular member of the staff, and he leaves for the Cape with the regrets and good wishes of a very wide circle of business friends.

Second-Lieutenant H. A. Johnston, Royal Flying Corps, who was killed in France on March 4, was formerly with Messrs. Siemens Bros., Dynamo Works. He entered the corps as a private. Although only twenty-four years of age, he had fitted wireless installations in many countries.

CONTRACTS AND ORDERS.

John Brown and Company have received a contract to supply sixty-four steel tires at £37 10s. per ton to Southend Tramways Department, delivery to be made when and as required.

The National Rail and Tramway Appliance Company have received an order from Bradford Tramways Committee for the supply of brake blocks, at an increase of five per cent. on the present contract.

Bradford Tramways Committee have accepted the offer of the Dunlop Rubber Company to supply rubber tires for railless trolley cars, at ·75d. per mile run per vehicle for two years from February, 1916.

Dover Tramways Committee have been asked to pay an increase of ¾d. per thousand in the price of tickets, the addition being described by the manager as equivalent to £14 a year. The committee decided to offer half of that amount.

Bootle Council have allotted the following contracts:—Reason Manufacturing Company, meters; British Insulated and Helsby Cables, fuse boxes; Siemens Bros. and Co., stoneware troughing; Vacuum Oil Co., oil; Trinidad Lake Asphalte Company, bitumen; General Electric Company, incandescent lamps.

Bradford Electricity Committee have placed contracts as appended:—Three water-tube boilers, with superheaters, etc., Babcock and Wilcox, Ltd.; three economisers, E. Green and Son, Ltd.; coalhandling plant, Goodall, Clayton and Co.; two 10,000-gallon boiler feed pumps, J. P. Hall and Sons, Ltd.; three cooling stacks, Film Cooling Towers, Ltd.; motors, Electromotors, Ltd.

Colchester Council have accepted the following tenders:—Electrical equipment of tramcars (for three months), Mr. G. W. Allsop and P. R. Jackson and Co.; overhead equipment (for three months), B.I. and Helsby Cables, Ltd.; rubber and fibre (for three months), L. Andrews and Co.; castings (for three months), Stanford and Co.; car fittings (for three months), British Hele-Shaw Co. and Stanford and Co.; oils and grease (for a year), Williams and Co.

Walthamstow Tramways Committee have accepted the following renewals of contracts for annual supplies:—Lamps, General Electric Co.; rubber packing, G. Angus and Co.; trolley heads, W. Wood and Co.; trolley wheels, Anti-Attrition Metal Co.; paints and varnishes, Docker Bros., R. Kearsley and Co., and L. Berger and Co. For controller fingers, pinions, gear wheels, armature coils, oils and grease, castings, green paint, and car accessories, the general manager is to obtain quotations as and when required.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. Mar. 23.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	64½	64½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	75/-	75/-
4%	4%	Do. 4% Deb. ...	100	91	73¾	72½
4½%	4½%	Do. 4½% Deb. ...	100	98½	73½	73
5%	5%	Do. 5% Deb. ...	100	96	78½	77½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92¾	92½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10¼	10¼
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97	97
$½	$½	Brazilian Trac. & Power Ord. ...	$100	66	52¾	50½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	89⅝xd	89¼xd
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6½	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91¼	91¼
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	37	39
5%	5%	Do. 5% Cum. Pref.	100	103	52	50¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	64½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	71xd	71½xd
70/-	70/-*	Do. 7% Pref.	100	55½	44	45¾
—	—	Do. 6% Pref. Ord.	100	17½	14	15¼
—	—	Do. Def. Ord.	100	11	9¾	10
5%	5%	Do. 5% Deb.	100	92	80½	80½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69¾	69¾
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87½xd	87½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¼	6 1/16	6 1/16
1/3	1/3	City of B.A. Trams.	5	5½	92/-	90/-
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	86¼	85¾
6/-	6/-	Dublin United Trys 6% Pref.	10	12	11 3/16	11 3/16
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	9/16	8/10½	8/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	55½	55½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	79¾	79¾
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48½	48½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/6	98/-
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	74xd	74xd
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78¾	78¾
$1¾	$1¾	Mexico Trams. Common ...	$100	70	27	27
5%	5%	Do. 1 Mt. 5% G.B.	—	84	35	35
6%	6%	Do. 6% Mt. Bds.	100	76	35	35
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94½	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/2*	1/2⅝*	National Steam Car	1	15/32	11/6	11/7½
9¾d.*	9¾d.*	New General Traction	1	⅞	7/9	7/9
1/2⅝	6d.	Northern Gen. Trans. Ord. ...	1	9/32	16/-	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	60/-xd	60/-xd
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	78¾	84
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	9/6	9/6
8d.	10d.	Provincial Trams. Ord.	1	¾	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	89	89¼
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74¾	74½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	88½
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76½	76½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅞	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	1915-16	Aggregate. Wks.	1915-16	Increase or Dec.
Anglo-Argentine	Mar. 18	£53,433	£52,078	12	£558,065	— £784
Auckland (28 days)	Feb. 11	19,932	20,518	32	169,226	+ 2,198
Ballarat and Bendigo ...	Jan. 2	4,439	4,438	40	32,932	— 2,772
Brazilian Traction Mlrs.	Jan.	5,996,190	6,430,000	5	6,430,000	+ 433,810
Brisbane	Feb.	34,050	30,320	9	62,600	+ 6,390
British Columbia $	Jan.	640,495	591,949	31	3,832,095	— 807,299
Buenos Aires Lacroze ...	Feb.	38,877	39,137	34	330,663	— 4,480
Burmah Tramway ... Rs.	Mar. 18	3,624	3,868	33	...	+ 7,330
Calcutta Rs.	,, 18	63,300	67,883	12	761,278	+ 50,375
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias..	Feb.	1,822	1,585	9	4,426	+ 1,700
Cordoba	Jan.	11,945	12,329	44	136,477	+ 5,102
East India	Feb.	1,649	1,863	30	14,394	+ 864
Hong Kong $	Feb. 19	13,042	11,455	11	95,743	+ 11,834
Kalgoorlie	Jan.	2,372	2,236	5	2,236	— 136
La Plata	Feb.	4,016	4,346	9	8,879	+ 331
Lima	Feb.	30,164	32,900	9	66,914	+ 3,707
Lisbon Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks) Rs.	Mar. 15	27,730	32,004	11	154,989	+ 18,760
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Jan.	62,729	69,879	5	69,879	+ 7,150
Mexico $	*	...	...	...	...	...
Montevideo	Feb.	30,008	32,502	17	126,466	+ 8,313
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai $	Feb. 16	28,474	28,589	...	...	...
Singapore $	Feb. 12	12,247	12,816	6	73,196	+ 10,501
Toronto $	Jan.	843,351	906,350	5	906,350	+ 62,999
Winnipeg	Jan.	350,681	297,560	5	297,560	— 53,121

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Aggregate. Wks.	1916	Incr. or Dec.
Aberdare	Mar. 14	£309	£330	+ £21	50	£17,781	+ £1,550
Aberdeen Corporation...	,, 15	1,650	1,581	— 69	41	73,536	+ 4,644
Accrington Corp.	Feb. 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	Mar. 18	230	231	+ 1	45	15,853	+ 1,105
Bath Electric	*	..	...	...	...	...	...
Birkenhead Corp.	,, 19	1,270	1,372	+ 103	50½	69,843	+ 6,447
Birmingham Corp.	,, 18	12,344	15,323	+ 2,978	51	734,663	+ 115,006
Do. Motor Omnibuses	,, 18	652	737	+ 85	—	41,770	+ 19,688
Blackburn Corp.	,, 15	1,115	985	— 130	50⅞	62,572	+ 77
Blackpool & Fleetwood.	,, 18	257	256	— 1	11	3,447	+ 87
Blackpool Corp.	,, 16	552	622	+ 70	51	77,507	+ 3,254
Bolton Corporation	,, 19	2,466	2,576	+ 110	51	135,881	— 155
Bournemouth Corp.	,, 22	1,807	1,743	— 64	51	105,995	+ 5,229
Bradford Corporation ...	,, 18	5,714	5,813	+ 99	51	323,271	+ 12,422
Brighton Corporation ...	,, 12	835	807	— 28	49⅞	53,493	+ 1,073
Bristol	,, 17	8,513	8,700	+ 187	11	100,207	+ 7,684
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 18	1,388	1,473	+ 85	51	81,110	+ 3,426
Burton-on-Trent Corp...	,, 19	245	248	+ 3	51	14,354	— 453
Bury Corporation	,, 19	1,243	1,227	— 16	50⅞	67,588	+ 383
Cardiff Corporation	,, 11	2,392	2,471	+ 79	49	133,591	+ 79
Chatham & District	,, 16	1,022	1,019	— 3	11	11,245	+ 703
Chesterfield Corp.	,, 16	245	246	+ 1	50	13,453	+ 170
Colne Corporation	,, 18	217	228	+ 11	...	...	...
Cork Electric	,, 16	481	417	— 64	11	4,841	+ 58
Croydon Corporation ...	,, 10	1,564	1,462	— 102	49	88,607	+ 5,202
Derby Corporation	,, 18	920	979	+ 59	50⅞	52,797	+ 2,493
Dover Corporation	,, 18	248	257	+ 9	50	15,213	+ 2,321
Dublin & Lucan	,, 17	149	120	— 29	11	1,243	— 38
Dublin United	,, 17	5,920	5,913	— 7	11	63,994	+ 4,097
Dundee City	,, 15	1,258	1,246	— 12	43⅞	59,105	+ 3,658
East Ham Corporation	,, 18	1,243	1,167	— 76	50⅞	65,923	+ 5,461
Exeter Corporation	,, 17	299	314	+ 15	50	18,494	+ 1,036
Glasgow Corporation	,, 18	20,749	21,149	+ 400	42	910,280	+ 69,432
Glasgow Subway	,, 18	1,048	1,208	+ 160	11	13,842	+ 1,701
Glossop (U. Elec. Supp.)	,, 18	101	122	+ 21	12	1,533	+ 252
Halifax Corporation	,, 14	1,967	1,699	— 268	49⅞	108,338	+ 705
Do. Motor Omnibuses	,, 14	43	24	— 19	49⅞	2,349	— 61
Hastings & District	,, 17	844	735	— 109	11	7,892	+ 60
Huddersfield Corp.	,, 18	2,329	2,543	+ 214	50	134,195	+ 17,827
Hull Corporation	,, 18	3,088	3,116	+ 28	50	156,446	— 661
Ilford U.D.C.	,, 18	563	610	+ 47	50	32,395	+ 3,481
Ilkeston Corporation	,, 23	116	119	+ 3	51	6,819	+ 416
Ipswich Corporation	,, 18	380	472	+ 92	50	27,013	+ 4,852
Isle of Thanet	,, 18	236	247	+ 11	24	6,030	— 997
Kilmarnock Corp.	,, 11	140	145	+ 5	43	7,192	+ 318
Lanarkshire	,, 16	1,726	1,976	+ 250	11	23,235	+ 4,036
Lancashire United	,, 15	1,527	1,475	— 52	11	17,137	+ 940
Leeds City	,, 18	7,897	8,549	+ 652	51	451,713	+ 36,988
Leicester Corporation ...	,, 18	2,830	3,179	+ 348	11	35,409	+ 4,607
Leith Corporation	,, 18	650	745	+ 95	44	33,724	+ 2,907
Leyton U.D.C.	,, 16	1,551	1,415	— 136	50	79,488	+ 8,646
Liverpool Corporation...	,, 18	12,491	12,650	+ 159	11½	146,676	+ 8,466
Llandudno & Colwyn B.	,, 17	189	185	— 4	15½	2,867	+ 53
London County Council	,, 8	41,974	46,556	— 4,582	49	2,167,952	— 18,076
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	,, 11	143	114	— 29	22½	2,967	— 888
Maidstone Corporation..	,, 16	168	163	— 5	50	10,588	+ 488
Manchester Corp.	,, 18	16,319	17,019	+ 700	50	897,378	+ 35,457
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	,, 18	148	178	+ 30	50½	9,811	+ 731
N'castle-on-Tyne Corp.	,, 11	5,795	5,483	— 312	50	304,815	+ 28,512
Newport (Mon.) Corp.	,, 18	742	840	+ 98	51	42,718	+ 2,188
New St. Helens & Dist.	,, 15	874	827	— 47	37	37,140	+ 3,451
Northampton Corp.	,, 17	685	640	— 45	50⅞	36,109	+ 5,663
Nottingham Corp.	,, 16	3,507	3,516	+ 9	50	186,506	+ 15,662
Oldham Corporation ...	,, 19	2,097	2,176	+ 79	51	117,142	+ 5,954
Portsmouth Corp.	,, 18	2,124	2,113	— 11	51	122,641	...
Preston Corporation	,, 15	842	904	+ 62	50	48,920	+ 3,178
Provincial	,, 18	1,926	1,948	— 22	24½	49,264	+ 3,279
Reading Corporation	,, 16	660	699	+ 39	50½	39,426	+ 4,240
Rhondda Tramways	,, 9	1,135	1,122	— 13	10	11,571	+ 949
Rochdale Corporation...	,, 18	1,435	1,501	+ 66	48½	84,737	+ 4,252
Rotherham Corp.	,, 22	954	1,261	+ 307	51	60,583	+ 8,849
Salford Corporation	,, 13	4,673	4,819	+ 146	50⅞	257,500	+ 12,900
Sheffield Corporation	,, 19	8,088	9,529	+ 1,441	51⅞	468,010	+ 66,392
Southampton Corp.	,, 15	1,216	1,371	+ 155	50	74,785	+ 9,114
Southend-on-Sea Corp...	,, 15	673	547	— 126	50	38,935	— 8,340
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 18	716	707	— 9	50⅞	39,657	+ 2,031
Sunderland Corp.	,, 19	1,296	1,458	+ 162	51	76,305	+ 2,945
Sunderland District	,, 15	556	525	— 31	20	11,197	+ 871
Swindon Corporation ...	,, 15	168	169	+ 1	50	9,765	+ 886
Torquay Tramways	,, 9	423	376	— 47	10	4,036	+ 202
Tyneside Trys. & Tmrds.	,, 15	559	465	— 94	11	5,273	— 180
Wallasey Corporation ...	,, 18	1,046	1,076	+ 30	50⅞	63,212	+ 1,686
Walsall Corporation	,, 16	652	739	+ 87	12	8,671	+ 1,179
Walthamstow U.D.C.	,, 18	745	785	+ 40	51	44,096	+ 4,133
Warrington Corp.	Feb. 24	414	481	+ 67	47	21,990	+ 1,470
West Ham Corporation	Mar. 16	2,901	2,872	— 29	50½	154,173	+ 12,387
Wigan Corporation	,, 16	1,379	1,480	+ 101	50	76,190	+ 3,246
Wolverhampton Corp.	,, 22	980	1,121	+ 141	51	57,123	+ 3,654
Yorkshire (W. Riding)	,, 19	1,362	1,518	+ 156	12	18,918	+ 1,960

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES.	LARGE AND SMALL.	PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

FINANCIAL REPORTS AND MEETINGS.

Leyland Motors, Ltd., are paying a dividend of fifteen per cent. for 1915, as against ten per cent. for 1914.

The British Westinghouse Electric and Manufacturing Company, Ltd., have paid a dividend on the preference shares for the year ended December 31, 1915, at the rate of seven and one half per cent.

A Record Year at Leeds.—It is estimated that the financial year of the Corporation Tramways ending on March 31, will show a surplus of £91,000 available in relief of the rates, after paying all the customary charges, including £25,000 in rates. For 1914-15 the grant to the rates was £81,000. The sum of £91,000 is the equivalent of a 10*d.* rate.

L.C.C. Tramway Receipts.—The tramway receipts from April 1, 1915, to March 8, 1916 (forty-nine weeks), were £2,167,952, a decrease of £18,076 as compared with the corresponding period of last year. For the two weeks ended March 8, the number of passengers was 19,681,852, a decrease of 2,472,603 over the corresponding period of 1915, while the receipts were £81,878, a decrease of £11,232. The route mileage was 141·67 miles.

Wemyss District Tramways Company.—The report shows a profit for the year (including the balance brought forward), after providing interest on the mortgage stock and placing £200 to the fund for redemption of that stock, of £5,774, less £1,746 paid in dividend on the six per cent. preference shares. The directors propose a dividend of seven and one half per cent., less income tax, on the ordinary shares, an additional one and a half per cent. on the preference shares, carrying £2,000 to the general reserve and £940 to next year's accounts.

Madras Electric Tramways Company.—The profits for 1915 were £22,498, and £3,258 was brought forward. After providing for debenture interest and other charges, and adding £6,000 to the renewal fund, the divisible balance is £14,289. A dividend of six per cent. is proposed on ordinary shares, writing £581 off issue expenses, and carrying forward £4,272, subject to excess profits duty. The traffic receipts show an increase of 6·4 per cent., the whole of the increase having occurred in the latter part of the year. The special renewals of the permanent way having been practically completed, the reduced sum of £6,000 has been credited to depreciation and renewal fund.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended March 11, the latest period for which full returns are available, give total receipts of £166,822, or £5,117 more than in the corresponding week of last year. The total length of track was 2,289 miles, or 25 more than for the corresponding week. The receipts this year were at the rate of £72 17*s.* 7*d.* per mile of single track, and last year at the rate of £71 8*s.* 6*d.*, thus showing an increase for the week of £1 9*s.* 1*d.* per mile open.

BUSINESS NOTES.

H.M. Consul, at Bilbao, suggests to United Kingdom firms, if they wish to preserve their position in Spain, that they should consolidate their connections and clientèle so as to be able to compete against the expected German business effort. Large numbers of Germans are now in Spain employed in obtaining information on every kind of subject.

Mr. G. T. Milne, H.M. Trade Commissioner for Australia, is now paying an official visit to Great Britain, in order that manufacturers may have the opportunity of consulting him. Those who desire to see him in London should make application to The Director, Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, E.C. Later on Mr. Milne will visit various provincial centres.

In order that British manufacturers may have an opportunity of familiarising themselves with German methods of publicity, the Board of Trade have collected over 3,000 specimen catalogues of German origin, and these may be inspected at the Foreign Samples Section of the Commercial Intelligence Branch, 32, Cheapside, London, E.C. Arrangements have been made whereby catalogues may be lent for a few days to firms in the provinces.

DICK, KERR & Co.,

Limited,

ABCHURCH YARD, CANNON STREET, LONDON, E.C.

ENGINEERS & CONTRACTORS.

Complete Equipment

TRAMWAYS & LIGHT RAILWAYS

at home and abroad.

New Ready.

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS;

MEMBER INSTITUTION OF MECHANICAL ENGINEERS;
MEMBER INSTITUTION OF CIVIL ENGINEERS, IRELAND;
MEMBER INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS;
MEMBER MUNICIPAL TRAMWAYS ASSOCIATION;
FELLOW PERMANENT WAY INSTITUTION.

CONTENTS.

—:o:—

FOREWORD.
"What is wrong with the Track?"

CHAPTER I.—CONCRETE FOUNDATIONS.
Defects—Causes of fracture—Method of laying concrete.

CHAPTER II.—CONCRETE MATERIALS.
Road metal—Water gravel—Sand—Clinker sand—Trass.

CHAPTER III.—REPAIRS TO CONCRETE FOUNDATIONS.
Patching—Partial repairs.—Complete renewal.

CHAPTER IV.—TRACK DESIGN.
"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.
Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

CHAPTER VI.—RAIL LAYING.
Bad rail packing—Rails canted or twisted—Anchoring and padding—Rail expansion and contraction—Curving of rails—Springing of rails—Anchoring new tracks.

CHAPTER VII.—JOINTS, FISH PLATES, BOLTS AND NUTS.
Why joints fail—Dished or hammered joints—Movement at joints.

CHAPTER VIII.—JOINT WELDING.
Methods of welding—Thermit weldin.—Electric arc welding process—Expansion and contraction—Oxy-acetylene process.

CHAPTER IX.—RAIL WEAR.
At joints—On new tracks—On steep gradients—On wheel tyres—Contact of wheel and tyre—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

CHAPTER XI.—CORROSION OF TRAMWAY RAILS.
Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

CHAPTER XII.—TRACK PAVING.
Effect of vehicular traffic—Cause of loose rails—Importance of quality in sets—Square-dressed setts—Nidged granite setts—Bonawe granite setts—Wood paving—Bedding of setts—Laying and ramming.

CHAPTER XIII.—RECONSTRUCTION.
Removal of tracks—Temporary tracks.

CHAPTER XIV.—SURFACE DRAINAGE AND RAIL MAINTENANCE.
Rail cleaning—Rail grinding—Rail planing.

CHAPTER XV.—SPECIAL TRACK WORK.
Design and standardisation of points—Unbroken main line crossings—Renewable plates—Switches—Mechanism for movable points—Heel pins—Tongue heel adjusters—Guard rails—Spiral tables for curves and junctions—Special track problems.

250 pages, 10 × 6½ × 1 in., with over 150 illustrations.

Price 10s. 6d.

A WORK OF REFERENCE, INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 17.] LONDON, SATURDAY, APRIL 1, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

MOTORS AND TRANSFORMERS.

The Electricity and Tramways Committee of the County of Warrington invite tenders for the following:—

1. Motors.
2. Transformers.

Specifications and forms of tender can be obtained from the undersigned on payment of one guinea for each specification, which will be returned on receipt of a bonâ fide tender.

Five shillings will be charged for extra copies of either specification.

Tenders, addressed to the "Chairman of the Electricity and Tramways Committee, Town Hall, Warrington," must be sealed with wax and endorsed "Tender for Motors," or "Tender for Transformers," as the case may be, and delivered not later than 12 o'clock noon on Tuesday, April 11, 1916.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS, M.I.E.E.,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

URBAN DISTRICT OF BRAY.

TENDERS FOR GENERAL STORES, AND FOR STORES REQUIRED AT COUNCIL'S ELECTRIC LIGHT WORKS.

Notice is hereby given that the Bray Urban District Council will, at their meeting to be held in the Town Hall, Bray, at 8 p.m. on Tuesday, April 4, 1916, be prepared to receive and consider Tenders for supply of general stores and stores required at Council's Electric Light Works, which are fully described in schedules, copy of which will be forwarded, together with form of tender, on application to the undersigned.

The Council do not bind themselves to accept the lowest or any tender.

Tenders must be on the prescribed form, and be delivered to undersigned, properly sealed and endorsed on cover, "Tender for General" or "Electric Light" stores, as the case may be, not later than date and hour above mentioned.

By order,
D. MULLALLY,
Clerk to the Council.

Town Hall, Bray.
March 15, 1916.

BARRY RAILWAY COMPANY.

BRASS, RAILS, ETC.

The Barry Railway Company are open to receive tenders for second-hand material, including: Brass, Rails, Heavy and Light Scrap, etc.

For particulars apply to the Secretary of the Company, Barry Docks.

COUNTY BOROUGH OF SOUTHAMPTON.

TO CONTRACTORS AND OTHERS.

METERS.

The Corporation invite Tenders for the supply and delivery of British-made Meters for the Electricity Department during a period of twelve months.

Specification, Condition and Form of Tender may be obtained upon application to the Borough Electrical Engineer, Electricity Supply Station, Western Shore, Southampton.

Sealed tenders, endorsed "Tender for Meters," must be delivered at the Town Clerk's Office on or before the 8th proximo.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE.
Town Clerk.

Town Clerk's Office,
Municipal Offices, Southampton.
March 21, 1916.

POSITIONS VACANT.

COUNTY BOROUGH OF OLDHAM.

GENERAL MANAGER OF TRAMWAYS.

The Tramways Committee of the Oldham Corporation invite applications for the position of General Manager of their Electric Tramways, at a commencing salary of £400 per annum, increasing by yearly increments of £50 to £500 per annum.

Candidates must have had experience in the management of electric tramways and in traffic superintendence.

A list of duties can be obtained on application to the undersigned.

Applications, stating age and present and past employment, with copies of not more than three recent testimonials, and endorsed "Tramways Manager," to be delivered at my office not later than Monday, April 10 next.

Canvassing, either directly or indirectly, will be regarded as a disqualification.

J. H. HALLSWORTH,
Town Clerk.

Town Hall, Oldham.
March 24, 1916.

COUNTY BOROUGH OF WEST HARTLEPOOL.

TEMPORARY ASSISTANT IN BOROUGH ENGINEER'S DEPARTMENT.

Applications are invited for the appointment of a Temporary Assistant in the Borough Engineer's Department. Applicants must be good draughtsmen, with a thorough knowledge of surveying, levelling, building and drainage inspection and the general work of an engineer's and surveyor's department. Salary at the rate of £110 per annum.

Applications, marked "Temporary Assistant," stating age, experience and qualifications, together with copies of two recent testimonials, and naming the earliest date on which applicant can take up duties, if appointed, must be forwarded to the undersigned not later than Monday, April 3, 1916.

NELSON F. DENNIS, M.Inst.C.E.
Borough Engineer and Surveyor.

Borough Engineer's Department, Municipal Buildings,
March 16, 1916.

READING CORPORATION TRAMWAYS.

SHIFT ENGINEER.

A Temporary Shift Engineer is required immediately for the above Tramways Power Station.

Commencing salary, £2 per week.

Applications should be addressed to the undersigned, and be accompanied by three recent testimonials.

G. F. CRAVEN,
General Manager and Engineer.

March 30, 1916.

Digitized by Google

'BUS BODIES FOR SALE.

For Sale, four single-deck 'bus bodies made in 1914 by the Brush Electrical Engineering Co., Ltd. Seating capacity, 24. Particulars to be obtained from Mr. Robert Birkett, Borough Electrical Engineer and General Manager, Corporation Light Railway and Electricity Department, London Road, Southend-on-Sea.

"TYNE METAL" BRAKE SHOES

HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.

Sole Manufacturers:

TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons' Tramway Material,
160, WOODHOUSE LANE, LEEDS.

Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 8488 Leeds. MATERIAL AND SUPPLIES

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

— (NATURAL, GLAZE, DULL FINISH, OR COLOURED) —
in twill, straight, or fancy weaves, canvas backed or unbacked, is

BRITISH MADE THROUGHOUT

from the splitting of the cane to the finished article.

We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, APRIL 1, 1916.

ACCELERATING TRAFFIC.

From various parts of the country there are indications that attention is being paid to the acceleration of traffic. With the increasing loss of motormen the importance of such efforts cannot be over-rated. Doubtless other devices than those that we are about to enumerate have been adopted by managers, and we shall be glad to receive particulars thereof. Reference may be made first to a pre-war innovation relating to an improved design of car that has proved of much service at Liverpool by enabling passengers to enter and alight with greater dispatch. This innovation, which was introduced by Mr. C. W. Mallins as the result of his study of the question, was described and illustrated in our issue of November 14, 1912, at the period when the payment-on-entry system was being given a trial in two English towns and a Scottish city. Lengthening the platforms, Mr. Mallins placed two staircases on each, thus providing separate entrance and exit. The Tramways Committee adopted this type as the standard car for Liverpool, and fifty of them now in service are proving very satisfactory. Another way of gaining time, which is so important now that fewer cars are running, was inaugurated in Bradford towards the end of last summer. Mr. Spencer eliminated some of the request stops, a procedure that might be followed with advantage in other towns. Even against the omnibus competition in London such a course would not be impossible of adoption, provided the public were taught to respect their own property and were made aware of the beneficial results to car equipment and running times. A report on the Bradford experiment would arouse wide interest. A more recent step designed to facilitate car traffic was taken by Bradford Watch Committee in scheduling places where passengers, if they number half a dozen, are to form into queues. If effect can be given to Mr. J. M. McElroy's suggestion to Manchester Tramways Committee to keep heavy motor vehicles to the side of the road, a way will be opened to obtain a benefit for tramway undertakings generally. The courageous foresight of Mr. A. L. C. Fell in maintaining against great opposition the fight to secure powers to run trailers, is conferring great advantage on the London tramways now that considerable deliveries of the 150 trailers have taken place. Among other valuable effects of this departure the teaching of an elementary traffic principle to the police is an advantage. We refer to the fact that less obstruction is entailed, whether at a busy junction or an open stretch of line, by a coupled unit than by two separate cars following each other at an interval of some yards. Recognising the impossibility of tramways generally obtaining delivery of trailers, Mr. E. Hatton, the engineer and general manager at Newcastle, has made two very interesting departures at the Tyneside city, where all the great works are served by only one route running practically parallel to the river. Mr. Hatton has coupled two cars, after removing one motor from each and re-wiring, so as to render the combination a 2-motor equipment, each car having one motor on the leading axle, one trolley standard having also been removed. The coupling consists of a rigid bar spring connected to each platform, the power cables passing through tubes fixed on the top and bottom of the bar. Several of these motorman-saving units have been running very successfully for some months. A second important and useful innovation at Newcastle is the alteration of single-deck bogie cars so as to provide an exit at the front platform and to secure a rush period accommodation for eighty instead of fifty-five passengers. As the Corporation possess sixty of these cars, the utilisation of them in this manner opens up great possibilities, including more speedy working. One advantage is that the conductor now has a clear platform, and is not impeded by passengers crowding at the rear of the car in order to be able to drop off without having to push through the crowd inside.

CARS IMPEDED BY SNOW.

Two of the worst snowstorms of the winter swept over Great Britain last Saturday and Monday nights. Trains were held up for hours by snowdrifts on the second occasion, many towns being isolated. The effects of the first storm were confined to part of Scotland. On the Paisley and District Tramways ten cars were snowed up, despite energetic work with snow ploughs. The management supplied the belated passengers with hot refreshments at the depots when at last they were liberated, and it was 7.30 a.m. before the last car was set free.

The snow added considerably to the troubles of the Edinburgh cable tramways.

Incessant activity by the tramways department with snow ploughs and the aid of 400 soldiers brought the Leicester tramways service fairly successfully through the second-mentioned storm. Passengers were thankful at escaping results more serious than those entailed by delay.

At Nottingham the cars were impeded by fallen telegraph and telephone wires, which caused short-circuiting. On one section these wires brought down the trolley wire.

Thanks to the early and frequent use of ploughs the Birmingham Tramways Department averted serious interference with traffic. In the outskirts many snowdrifts had to be removed. Fallen telegraph wires and snowed up horse vehicles were frequent causes of delay. Passengers by the last motor omnibus between Stourbridge and Birmingham had to struggle through the storm on foot for seven or eight miles through the 'bus entering an impassable drift.

Lancashire and Yorkshire escaped the full severity of the storm as far as the condition of the streets of the towns was concerned.

Tramway traffic between Dudley and Sedgley was suspended, and on all the other routes there was a much curtailed service.

At West Bromwich the cars were unable to run early in the morning. The service between Oldbury and Smethwick was suspended.

For some time the Wolverhampton service was at a standstill; and there was some curtailment at Walsall.

Wales suffered severely. The Rhondda Tramways Company's service had to be discontinued early on Monday night. Ploughs were kept going at Cardiff, but the service was for a time dislocated.

Ipswich cars were held up on two routes owing to a large tree being blown down. It fell on a car, and one passenger was injured.

Monday night was a record for damage on the London United Tramways. Trees fell in thirteen places across the lines, and in some places the trolley wires were brought down. All the services were restored by Wednesday morning.

Several cars were embedded on the outlying portions of the Bath Tramways, and traffic was suspended on part of one section on Tuesday.

Digitized by Google

TRIBUNAL CASES.

Among the applications made to the Wallsend Military Tribunal on March 25 was that relating to the Tyneside Tramways Company. Mr. J. C. Little, the secretary and manager, said the company employed eight women as conductors, but they were not considered suitable to place the trolleys on the wire. Application had been made to the Ministry of Munitions for badges for certain grades of the men, including the conductors, as the cars carried a large number of munition workers. Mr. Little applied for the exemption of one conductor and a motorman. The Tribunal did not allow the application for the conductor, but granted conditional exemption to the motorman.

In support of an application made to the Oxford Tribunal for the exemption of an omnibus unit adjuster in the employ of the local Tramways Company, Mr. A. A. Tyler, the manager, said the company were much understaffed through having sent more men to the army than they employed in normal times. The man was engaged in looking after the safety of the vehicles, and was also a relief driver. At night he drove an ambulance to and from the station. Conditional exemption was granted.

The Town Clerk of Exeter, in applying for the conditional exemption of two motormen, said that tramcar drivers fell within the certified occupations, but the Tramways Committee had released practically every man that could be of service in the Army. There were now thirteen drivers who were over military age and fifteen who were eligible, all married. Fourteen of them had attested. Exemption was granted until August 31.

Wakefield (West Riding) Electric Tramways Company on March 29 applied for the exemption of 52 employees, mostly skilled workmen employed at the depôt, who were indispensable to the proper working of the undertaking. In 17 cases temporary exemptions were granted, and in most of the other cases exemptions so long as the men continue in their present class of employment.

LITIGATION OVER HOLIDAYS.

The case of a dismissed Sheffield conductor against the Corporation for a week's wages in lieu of a week's holiday, which was reported in our issue of January 15, is occupying the attention of the Law Courts. At Sheffield County Court, on January 7, Judge Benson decided in favour of the plaintiff, James Sturt, but on March 27 the King's Bench Division reversed the decision. Now there is to be an application to the Appeal Court by Sturt, who is supported by the Tramway and Vehicle Workers' Union. According to counsel for the Corporation there are some eighty cases dependent on the result of the case.

Mr. Macmorran, K.C., for the Corporation, said that Sturt was dismissed in August, 1915, and claimed a week's wages in lieu of a holiday. Beginning in 1907, all Corporation workmen of not less than twelve months' service were given one week's holiday in each year between April and October. The judge at Sheffield regarded it as an agreement under which, if a man worked for fifty-one weeks, he was entitled to a week's holiday. Counsel contended there was no legal obligation, and that the holiday was a matter of indulgence.

For the respondent, Mr. Shortt, K.C., said the agreement to give a week's holiday was in lieu of an advance of wages, and had been treated by the men and their union as one of the conditions of service. After the war began the Tramways Committee decided that where holidays could not be given in 1915 a week's pay would be granted. Respondent had completed over a year's service without a holiday when he was dismissed. Other men who had worked in lieu of holiday on account of the war pressure had been paid an additional week's wages.

Mr. Justice Lush, in delivering judgment (in which Mr. Justice Rowlatt concurred), said that under the terms of the Corporation's resolution there would be a breach of contract if a man did not receive his holiday or a week's pay before the end of October, but if the contract of service were terminated before the expiration of that period he did not think there was any breach of contract.

The appeal was allowed with costs.

MOTOR VEHICLES FOR MUNICIPALITIES.

Burton-on-Trent Tramways Committee have obtained a Provisional Order from the Local Government Board empowering them to provide motor omnibuses for use within the borough.

The War Office have agreed to release the six motor lorry chassis that Sheffield Highways and Sewerage Committee have had on order since August, 1914.

Plymouth Corporation Gas Committee have agreed to purchase an eighth Mann steam wagon. The Works Committee have instructed the borough engineer to present a report on the use of mechanical and horse traction for refuse collection, general cartage, watering, and cleansing. Two Mann steam wagons are at present in use for such work.

The provision of railless trolley vehicles and omnibuses in connection with Reading Corporation Tramways has been deferred until after the war, in accordance with the recommendation of the Tramways Committee. At the March meeting of the Council, Alderman Chivers proposed that one motor omnibus be purchased forthwith, but the motion was lost.

Lancaster Corporation are making application to the Local Government Board for permission to borrow £10,000 for the purchase of omnibuses to be run by the Tramways Department. The Lancashire County Council's Roads and Bridges Committee have recommended that the County Council enter into an agreement with the Corporation for the latter to maintain all the main roads in the borough for a period of five years from April 1, 1916, on the same terms as the existing agreement, subject to the condition that the omnibuses be limited to six, and be prohibited from being used outside the borough boundaries.

NO ROAD MAINTENANCE CHARGE ON LONDON OMNIBUSES.

In the House of Commons on March 30, Mr. Anderson asked the President of the Local Government Board whether he was aware that in 1913 the motor-omnibuses of London ran 105,000,000 miles; that this traffic caused much damage to the highways, and that the engineer to the Middlesex County Council estimated that the cost of repairing a particular road was increased by such traffic to the extent of 2*d*. per omnibus mile; whether, in view of the conditions of motor-omnibus competition with the London municipal tramways in that the latter had to lay, maintain, repair, and pay rates upon their tracks, whereas the omnibus had the free use of the roads, the Government would introduce a Bill to enable municipal authorities to control street traffic and to levy a roadway maintenance charge upon motor-omnibus traffic.

Mr. Hayes Fisher (Parliamentary Secretary to the Local Government Board): The President of the Local Government Board feared it would be quite impossible for the Government to introduce legislation on this subject at the present time.

THE EMPLOYMENT OF WOMEN DRIVERS.

Glasgow Tramways Department are largely increasing the number of women engaged as drivers, following the success of the experiment of thirty-one women working in that capacity. The women conductors now number 1,200. Those with six months' service are being paid 29s. per week, an increase of one shilling having recently been voted by the Corporation.

Women have for some time been working as drivers on the Bordeaux electric tramcars, and their work has given satisfaction.

The Edinburgh magistrates on March 26 granted a licence to a woman driver on the Musselburgh and District Electric Traction Company's undertaking, a short portion of which is within the city.

MISCELLANEOUS NEWS AND NOTES.

Trolley-wire Renewal.—Southend Tramways Committee propose to renew the trolley-wire on the Leigh section at an estimated cost of £1,206.

Birkenhead Tramway Collections.—Collections for war objects are proving successful on the Birkenhead cars. In six weeks £233 has been received.

Shortness of Power at Wolverhampton.—The great demand for energy for industrial purposes at Wolverhampton resulted in a reduction of the car service for nearly an hour on March 24.

War Office Lorries for the Port of London.—The War Office have placed at the disposal of the Port of London Authority forty motor lorries for one month, to assist in the clearance of goods from the docks.

Southend Omnibus Service.—Owing to local conditions, Southend-on-Sea Corporation have abandoned their motor omnibus services for the present. It is possible, however, that after the war a new service will be inaugurated.

Spitting from Cars.—Complaint is made that the Glasgow Tramways bye-laws do not deal with persons who expectorate from tramcars into the street. A correspondent states that Aberdeen can give Glasgow points in this matter.

Impressment of a Turbo-Generator.—A report has been received by Melbourne City Council that a 5,500 k.w. turbo-generator, which they had ordered from the British Westinghouse Company, has been taken over by the British Government.

No Rate Relief from Newcastle Tramways.—Owing to a reduction of fivepence in the pound in the Newcastle Corporation rates for the ensuing year, no call has been made upon the Tramways Committee for a contribution in relief of the rates.

Where there are no Women Conductors.—Chester Corporation Tramways stand almost alone in being without any women conductors. The department are not short of labour and none of the conductors are eligible for military service.

Electric Wagons for Glasgow.—After visiting Sheffield, Nottingham, and Dover, to inspect the work of electric wagons in collecting house refuse, a sub-committee of Glasgow Cleansing Committee have recommended the Corporation to purchase two 2-ton Edison electric wagons.

Loughborough Motor Omnibus Company, who are already operating five electric omnibuses, have offered to purchase the Edison omnibus belonging to Southend Corporation Tramways Department, for the sum of £1,100. The Tramways Committee have adjourned the consideration of the offer for six months.

Electric Power in Canada.—The Government of Toronto have completed negotiations for the purchase at a cost of over eight million dollars, of the entire business and assets of the Canadian Electric Power Company and twenty-two subsidiary companies operating in Central and Eastern Canada. A Reuter's telegram states that the power will be sold at cost.

Digitized by Google

A Birmingham Extension Scheme.—Owing to the industrial development of the district between the Erdington Tramways terminus and Tyburn, there is a revival of the project for constructing a double line between those places. The distance is about two miles. There was a discussion of the scheme at a conference held in Birmingham on March 23 between the departments concerned.

Colwyn Bay and Double-Deck Cars.—The Board of Trade have forwarded to Colwyn Bay Council an extract from the report of Colonel Druitt with reference to the recent inquiry held by him into the Council's objections to the use of double-deck cars. The Clerk informed the Council on March 21 that the Board had not yet come to a decision, and the Council referred the communication to the General Purposes Committee.

Passengers Fined for not Drawing Blinds.—A number of cases were heard at Birmingham on March 21, in which passengers were each fined ten shillings under the lighting restriction order for failing to keep blinds of railway carriage windows lowered. The magistrates said every passenger was equally responsible for seeing that the blinds were drawn, whether sitting near the window or not.

Proposed Aberdare Extension.—On the recommendation of the Tramways Committee the Aberdare Council have requested Mr. S. Sellon, their consulting engineer, not to accept any tenders for the construction of the Aberewmber track until the rails could be bought and were ready for delivery. A member remarked that rails could not be obtained from America, and "there would be no German rails this time."

Fines for Boarding Full Cars.—Three women have been fined 5s. each at Birmingham for entering a fully-loaded tramcar. Their excuse was that "the front seats were not occupied," but the magistrate pointed out that the public had a mistaken notion that if the front seats were not occupied they were entitled to board the car. On a wet day, even though the front seats might be vacant, the car might contain the full complement of passengers.

With the Forces.—Up to February last over 1,500 employees of Messrs. Siemens Bros and Co., Ltd., and Siemens Bros'. Dynamo Works, Ltd., had joined the Forces. Forty-three of them have fallen. Of the employees of W. T. Henley's Telegraph Works Co., 551 have responded to the call, and the casualties to date number forty-nine. Two of the men—Corpl. W. Dagger and Driver J. Mason—have been awarded the D.C.M., but the corporal has since been killed.

Prospect of a Record Year at Glasgow.—The darkening of the streets and cars is not now affecting the tramway receipts so much as was at first the case, and the financial year ending on May 31 is likely to provide another record. The traffic return to March 25 shows receipts exceeding £930,000, or £70,000 in advance of the corresponding period of 1914, while the passengers have increased by 23 millions. For the complete year the revenue is likely to considerably exceed a million sterling.

Comforts for Glasgow Tramways Battalion.—In order to provide comforts, etc., for the battalion of tramwaymen who are serving abroad, a committee of ladies has been formed. The members include Mrs. Dalrymple and Mrs. Grant, and rooms for packing and other work are provided at the Bath Street offices. All the work of making up the garments (and in other directions) is done free by the wives and mothers of the men and members of the tramways staff. There is a sum of £237 in hand, and on March 16 a considerable sum was received as the result of a whist drive.

Government Purchase of Railway Wagons.—It was reported on March 21, at a meeting of the Yorkshire Committee on the use of nitre cake in West Riding industries, that the Government had purchased 150 wagons, and these were being painted and prepared for transporting the cake, and would be put into commission as soon as possible. The Committee recently complained of the delay in the delivery of the nitre cake, which is being utilised in consequence of the Ministry of Munitions having in December last cut off the supply of sulphuric acid for many trade purposes.

Ministry of Munitions Certificates.—Under the Munitions of War Act, 1915, the whole of the Southampton Corporation Tramways undertaking has been included in the Ministry of Munitions certificate, and is subject to very much the same regulations as a controlled establishment. Paisley Company have been granted a certificate, accompanied by a communication stating that for the purpose of carrying on the production of munitions, it is of importance that good tramway facilities be maintained. Similar certificates have been received by the Bolton Tramways Committee and South Lancashire Tramways Company.

Institution of Automobile Engineers.—On Wednesday, April 12, at the Surveyor's Institution, 12, Great George Street, S.W., at eight p.m., Major B. W. Shilson will read a paper entitled "From Engine to Axle." This paper is intended as a connecting link between the papers recently read by Messrs. G. W. Watson and W. D. Williamson, and the three papers together cover the whole field of the engine and transmission of the petrol-driven heavy motor vehicle. Cards of invitation may be obtained from the Secretary of the Institution, 28, Victoria Street, London, S.W.

Edinburgh Tramways.—Although the Tramways Company's lease does not expire until three years hence, a report on the subject of the renewal will be placed before the Corporation at their next meeting. At the meeting of the Council held in March the following notice of motion was remitted to the Tramways Committee:—(1) That the Committee discontinue negotiations for taking over the rolling stock; (2) that the cars in future be on the electric system; and (3) that immediate steps be taken to carry out this resolution, so as to ensure as little inconvenience as possible to the users of the cars.

Problem of Invalided Tramway Soldiers.—Mr. W. Clough, general manager of Bury Corporation Tramways, has asked the Tramways Committee for instructions upon the course of action to be followed in the cases of soldiers discharged from the Army in a condition that renders them unfit to undertake their old duties on the tramways. He had been unable to find sufficient light work for such men. The matter was referred to the General Purposes Committee for consideration.

Accident to a London Car.—The quadrupled tramway track at Dog Kennel Hill, East Dulwich, was the scene of a mishap about 9 a.m. on March 27. A car started running backwards just as it had reached the brow of the long and steep ascent. When it reached the curve where the lines converge into double track the car collided with a stationary car, left the rails, crossed the foot pavement and broke through a fence into a field. The driver, who jumped from the car when it mounted the kerb, had gained some control over it. No glass was broken and no passenger was injured. The quadrupled track was constructed with the view of avoiding collisions in such mishaps as this.

Lancaster's Charges for Energy and Paving.—At the March meeting of Lancaster Council, Mr. T. Wilkinson, chairman of the Tramways Committee, said he could not understand why preferential treatment should be given to other Committees and the Tramway Committee be repeatedly held up to contumely. The Committee paid 1·7*d.* per unit for current, whilst many places were only paid .54*d.* If at Lancaster they paid the average price charged in the country they would only need to call upon the rates for £550 per year. The Tramways Committee were subsidising the Electricity Committee, and in addition they had to pay the cost of wood pavement along the tramway route. If the tramways had been a private undertaking they would only pay the cost of granite paving inside the lines and eighteen inches outside.

PERSONAL.

Mr. A. Grant has been appointed manager for India of the British Insulated and Helsby Cables, Ltd.

Mr. R. Burton Chadwick, recently chairman of the Liverpool Shipowners' Association, has been appointed by the Minister of Munitions to act as the director of Munitions Overseas Transport.

Corporal J. N. Smith, of the Nelson Corporation Tramways staff, has won double distinction in France. He is in the East Yorkshire Regt., and at Ypres he cut barbed wire entanglements under heavy fire, thus allowing his section to advance. For a second act of gallantry he has received the Russian Order of St. George.

Mr. T. R. Whitehead, engineer and general manager, Coventry Corporation Tramways, has been granted an increase of salary from £500 to £600 per annum. Councillor Vernon Pugh, chairman of the Tramways Committee, stated that since the undertaking was purchased by the Council, a sum of £22,000 had been expended on extensions, and the amount would have been much larger but for the war. The receipts had increased from £30,153 to £45,404. In the week ended March 19 last the passengers numbered 243,572, as against 173,572 in the corresponding week of 1913. There would be a substantial profit on the year ended March 31, 1916, but whether the Council would be able to deal with it or whether the Treasury would require a part of the sum he could not say.

Mr. F. W. Lacey, borough engineer of Bournemouth, died on March 24, at the age of sixty years. Mr. Lacey constructed the permanent way of the Corporation Tramways.

CONTRACTS AND ORDERS.

War Office Contracts.—Recent contractors for motor lorry bodies include:—J. Bartle and Co., Western Ironworks, Notting Hill, W.; Chalmers and Co., Redhill; W. and G. Du Cross, Ltd., Acton, W.; and Million Guiet, Cricklewood, N.W.

Johannesburg Tramways Committee have advised the Council to accept the following tenders for new plant at the electric lighting and tramways station:—Sykes and Co., two 3,000 kw. turbo-alternating sets, with Parsons condensing plant, switchgear, etc., £26,395, and spare motor £798; Griffin Engineering Co., wet-air filtration plant, £690.

Orwell Electric Vehicles, manufactured by Messrs. Ransomes, Sims, and Jefferies, Ltd., of Ipswich, have recently been purchased by the Midland Railway Company and Ipswich Co-Operative Society. The vehicle supplied to the Midland Railway Company is a 30-cwt. electric tilt van, while the local order is a 2-ton lorry. The Midland Company already own twenty-seven electrics.

Portsmouth Council have accepted the following tenders for tramway supplies:—

Steel tires: Scholey and Co., Ltd., 56, Victoria Street, S.W., £3 19s. per tire; Insulating materials: Bromall Patents Co., Ltd.; Steam coal: Pensford and Bromley Collieries, Ltd., 21s. 11*d.* per ton; Insulating tape: Spicer Brothers, Ltd., P. R. Jackson and Co., Ltd., Micanite and Insulators Co., Ltd., Mica Manufacturing Co., Ltd., General Electric Co., Ltd., Carr Brothers, Ltd.; Incandescent lamps: British Thomson-Houston Co., Ltd.; Overhead line material: Fleming, Birkby and Goodall, Ltd., F. Smith and Co., Ltd.; Lubricating oils, etc.: Engelbert and Co., Vacuum Oil Co., Worsingham and Co.

Digitized by Google

FINANCIAL REPORTS AND MEETINGS.

Melbourne Tramway and Omnibus Company.—The board announce a dividend of 6*d.* per share for the quarter ended March 31, and also a bonus of 1*s.* per share.

Hastings and District Electric Tramways Company.—As the result of the past year's working £1,000 is placed to depreciation, £1,500 to suspense account, and £766 carried forward, after paying six per cent. dividend on the preference shares.

Five per Cent. Railway Debenture.—The North British Railway Company is the first British railway to make an issue of debenture capital bearing five per cent. interest. The loan will be redeemable at par in three, four, or five years at the holder's option, and the issue will be in sums of £200 and upwards.

Minimum Prices.—Minimum quotations have been removed from all securities quoted in the official Stock Exchange list under the heading of "Railways—British Possessions." The securities affected are Canadian railway debentures. Minimum prices are still maintained on nearly all British Corporation and County stocks, Home railway debenture, preference and other prior charges, Indian railways, as well as Indian Government stocks, local loans, Irish land, and some other obligations of the British Government. It is probable, however, that the restriction with regard to these will be removed shortly, the minimum prices having apparently outlived their usefulness, and no object can now be served by maintaining them.

The British Westinghouse Company.—The report for the year ended December 31, 1915, shows that the net profit for the year amounted to £176,752, and including the balance brought forward from last year of £8,121, there is a total balance of £184,873. This sum has been appropriated as follows:—Amount written off patents, goodwill, etc., £25,000; special depreciation of plant, machinery, etc., £35,241; additional reserve for employers' liability, £5,000; dividend of 7½ per cent. on preference shares, £75,000; carrying forward £44,632. Having regard to the possible liabilities for taxation of excess profits under the Finance and Munitions of War Acts, the directors have thought it desirable to carry forward a much larger sum than usual. The report states that the company was declared to be a controlled establishment under the Munitions of War Act, 1915, as from August 18.

Rhondda Tramways Company.—Mr. H. T. Barnett presided at the annual meeting on March 23. The accounts showed a balance of £8,577, and the directors recommended its disposal as follows:—Reserve and renewals, £2,000, special reserve for expenditure on permanent way that should have been incurred during the past year, £1,100, carrying forward £5,577. The gross revenue amounted to £64,596, against £66,368 in 1914. In moving the adoption of the report, the chairman said that when the clouds seemed to be lifting the war broke out, so that the undertaking had never had an opportunity of showing its real earning capacity. He suggested to the rating authorities, as well as to the employees, that it was not the wisest husbandman who killed the goose before it could lay the golden egg. There was a balance on the year's working of £1,893, as compared with £8,190 in 1914.

Effect of War Traffic at Dover.—In presenting his estimates for 1916-17 to Dover Tramways Committee, Mr. E. Carden, general manager, said the receipts for the expiring year were twenty per cent. in excess of the estimates, and the expenses seven per cent. in excess. Although fifty per cent. of the staff had enlisted, a time-table similar to the summer traffic had been worked throughout the winter. The receipts exceeded the estimate by £2,645. This enabled them just to clear the expenses, including the capital charges amounting to £4,000. Ten years had elapsed since a net profit was recorded. If the Committee were charged the average price paid for power by other tramways there would have been a profit of £2,000 on the past year's working. The total receipts were £15,805, and for the ensuing year the estimate was £15,000. The expenditure on the permanent way for 1915-16 was £1,157, and on the cars £1,278, while for the ensuing year sums of £1,000 and £1,190 were allowed under those heads.

Mansfield and District Tramways.—Mr. A. R. Holland, who presided at the annual meeting, said the business had continued steadily to increase, and this gradual building up of the position enabled them to recommend a dividend of seven per cent. on the ordinary shares, and to carry forward practically the same amount that was brought in. This result had been obtained after amply providing for maintenance, repairs and renewals. The results for the current year to date showed a slight increase. In connection with colliery developments in the district the directors had the matter of possible extensions under consideration. Meantime temporary arrangements had been made for the convenience of troops, and for the large number of colliery workers. During the year the company had carried 5,000,000 passengers, and the cars had run more than 560,000 miles. The reserve account, with the additions during the year, amounted to £13,500, and a portion had been invested in war loan stock.

Tramways, Light and Power Company.—Viscount Chilston presided at the third annual meeting, when it was decided to pay a dividend on the preference shares for the year to December 31, 1915, at the rate of six per cent. per annum, which requires, less tax, £15,975, and to carry forward to the next account a balance of £3,348. In proposing the adoption of the report the chairman said the earnings were derived from the Derbyshire and Nottinghamshire Electric Power Company, Nottinghamshire and Derbyshire Tramways Company, Leamington and Warwick Electrical Company, Leicestershire and Warwickshire Electric Power Company, Midland Electric Light and Power Company, Limited, and Cheltenham and District Light Railway Company—the whole of the debenture and share capital of the last-mentioned company having been taken over last October. The directors were of opinion that the company lived through their worst year in 1915. The various undertakings had only to continue the present rate of earnings to show a considerable increase during the current year. During the year additional consumers for power had been obtained to about £10,000 per annum. The total sum to be dealt with was £32,214. After meeting general expenses and debenture and loan interest there was a balance of £19,324, compared with £18,329 the preceding year, although £2,000 more had been paid in debenture and loan interest.

Leicester Corporation Tramways.—The following is a summary of the report for the year ended December 31, 1915, with a comparison of the results of the previous year:—

	1915.	1914.	Inc. or dec.
Traffic revenue	£159,678	£149,664	+ £10,014
Other revenue	28,842	20,571	+ 8,271
Total	188,520	170,235	+ 18,285
Working expenses	122,142	118,607	+ 3,535
	66,378	51,628	+ 14,750
Add bank interest	355	—	+ 355
Reserve fund interest	—	1,660	— 1,660
Gross balance	£66,733	£53,288	+ £13,445
Interest on mortgages, etc.	26,229	24,010	+ 2,219
Redemption of debt	16,647	13,765	+ 2,882
Income tax	4,484	2,801	+ 1,683
Bank interest	—	207	— 207
War allowance, reservists, etc.	7,412	1,284	+ 6,128
Net balance	11,961	11,221	+ 740
	£66,733	£53,288	+ £13,445

Other statistical information given in the report is as follows:—

	1915.	1914.	Inc. or dec.
Units per car mile	1.97	1.82	+ .15
Power cost per car mile	1.927*d.*	1.469*d.*	+ .458*d.*
Traffic receipts per track mile	£4,202	£4,045	+ £157
Traffic receipts per car mile	9.827*d.*	8.682*d.*	+ 1.145*d.*
Expenses per car mile	7.516*d.*	6.880*d.*	+ .636*d*
Ratio of expenses to revenue	68%	69%	— 4%
Total track mileage	37	37	
Number of cars in stock	160	160	

Mr. A. F. Lucas, the general manager, attributes the increase in passenger receipts, which occurred principally during the latter part of the year, to the exceptionally good trade of the town and to increased fares. The issue of discount tickets was discontinued on May 7, 1915. The number of passengers carried was 40,440,158, an increase of 2,525,385, and the cars ran 3,899,939 miles, a decrease of 237,323. The total receipts averaged 11.601*d.* per mile, against 9.875*d.* last year, an increase of 1.726*d.* per car mile. Owing to the shortage of male labour it was decided to employ women as conductors during the period of the war, and from October 27 to December 31, 1915, 67 women were trained, and these are doing their work satisfactorily. Mr. T. Robert Smith, the engineer, reports that the new machinery installed at the Lero power station has worked in a very satisfactory manner throughout the year, and has undoubtedly contributed to a reduction in the working costs; but the increased price of fuel has had an adverse influence on the generating costs. Mr. Smith states that while the overhead work of the tramways is in good condition, it will be necessary to renew a considerable length of trolley-wire during the year. Four canopy tops were fitted to open-top cars at a cost of £360 10*s.* 6*d.*, and further tops are being provided as other cars come in for roof repairs.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended March 18, the latest period for which full returns are available, give total receipts of £170,051, or £8,674 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £71 19*s.* 10*d.* per mile of single track, and last year at the rate of £70 8*s.* 9*d.*, thus showing an increase for the week of £1 11*s.* 1*d.* per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Mar. 30.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	64½	64½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	75/-	75/-
4%	4%	Do. 4% Deb. ...	100	91	73	73¾
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	73½
5%	5%	Do. 5% Deb. ...	100	96	77½	78½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 3/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92¾	92¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10 5/16	10½
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97	97
$½	$½	Brazilian Trac. & Power Ord....	$100	66	52¾	52¾
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92	89½xd
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅝	6⅝
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91¼	91¼
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	37	37
5%	5%	Do. 5% Cum. Pref.	100	103	51½	52
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64xd	64½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	71	71xd
70/-	70/-*	Do. 7% Pref.	100	55½	44½	44
—	—	Do. 6% Pref. Ord.	100	17½	16	14
—	—	Do. Def. Ord.	100	11	9¾	9¾
5%	5%	Do. 5% Deb.	100	92	80½xd	80½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69½	69¾
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	87⅝	87½xd
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6 1/16	6 1/16
1/3	1/3	City of B.A. Trams.	5	5½	91/10½	92/-
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	86½
6/-	6/-	Dublin United Trys 6% Pref.	10	12	11 3/16	11 3/16
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	5/6	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1⅜d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	9/16	8/9	8/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	55½	55½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	87½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	78	79¾
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48½	48½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/6	98/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70½	74xd
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78¾	78¾
$1¾	$1¾	Mexico Trams. Common ...	$100	70	23	27
5%	5%	Do. 1 Mt. 5% G.B.	—	84	37½	35
6%	6%	Do. 6% Mt. Bds.	100	76	35	35
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/2*	1/2⅝*	National Steam Car	1	15/32	11/6	11/6
9⅜d.*	9⅜d.*	New General Traction	1	⅞	7/9	7/9
1/2⅜	6d.	Northern Gen. Trans. Ord. ...	1	25/32	16/-xd	16/-
5/-	6/-	Para Elec. Rlys. Ord.	5	4¼	60/-	60/-xd
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	78¾
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	11/3	9/6
8d.	10d.	Provincial Trams. Ord.... ...	1	⅝	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	89⅜	89
5%	5%	1st. Mt. 5% 50 yr.	100	89½	76½	74¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	88½
5%	5%	Do. 5% Perp. Deb.	100	99½	79½	77½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76½xd	76½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Increase or Dec.
Anglo-Argentine	Mar. 25	£51,827	£51,257	13	£609,322	— £1,354
Auckland.....(28 days)	Feb. 11	19,932	20,518	32	169,226	+ 2,198
Ballarat and Bendigo ...	Jan. 30	3,388	3,399	44	36,831	— 2,761
Brazilian Traction Mlrs.	Jan.	5,996,190	6,430,000	5	6,430,000	+ 433,810
Brisbane	Feb.	34,050	30,320	9	62,600	+ 6,390
British Columbia.....$	Jan.	640,495	591,949	31	3,832,095	— 807,299
Buenos Aires Lacroze ...	Feb.	38,877	39,137	34	330,663	— 4,480
Burmah Tramway ... Rs.	Mar. 25	3,774	3,682	34	...	+ 7,238
Calcutta.....Rs.	,, 25	62,970	62,636	13	823,914	+ 50,041
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias..	Feb.	1,822	1,585	9	4,426	+ 1,700
Cordoba	Jan.	11,945	12,329	44	136,477	+ 5,102
East India	Feb.	1,649	1,863	30	14,394	+ 864
Hong Kong .....$	Feb. 26	17,606	20,422	12	116 165	+ 14,650
Kalgoorlie	Jan.	2,372	2,236	5	2,236	— 136
La Plata	Feb.	4,016	4,346	9	8,879	+ 331
Lima	Feb.	30,164	32,900	9	66,914	+ 3,707
Lisbon .....Escu.	Nov.	...	170,130	...	...	...
Madras (2 weeks).....Rs.	Mar. 15	27,730	32,004	11	154,989	+ 18,760
Manila .....$	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Jan.	62,729	69,879	5	69,879	+ 7,150
Mexico .....$	*	...	...	...	...	...
Montevideo	Feb.	30,008	32,502	17	126,466	+ 8,313
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai .....$	Feb. 23	26,704	24,573	...	...	...
Singapore .....$	Feb. 19	11,284	12,645	7	85,841	+ 11,862
Toronto.....$	Jan.	843,351	906,350	5	906,350	+ 62,999
Winnipeg	Jan.	350,681	297,560	5	297,560	— 53,121

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	Mar. 14	£309	£330	+ £21	50	£17,781	+ £1,550
Aberdeen Corporation...	,, 22	1,533	1,623	+ 90	42	75,159	+ 4,734
Accrington Corp.	Feb. 2	443	534	+ 91	44	24 521	+ 1,014
Ayr Corporation	Mar. 25	236	244	+ 8	46	16,098	+ 1,114
Bath Electric	*	..	...	...	...	...	...
Birkenhead Corp.	,, 26	1,230	1,359	+ 129	51	71,202	+ 6,577
Birmingham Corp.	,, 25	12,550	15,298	+ 2.748	52	749,962	+ 117,754
Do. Motor Omnibuses	,, 25	668	731	+ 63	—	42,501	+ 19,752
Blackburn Corp.	,, 22	1,052	1,057	+ 5	51⅔	63,629	+ 95
Blackpool & Fleetwood.	,, 25	284	262	— 22	12	3,709	+ 65
Blackpool Corp.	,, 23	574	646	+ 72	52	78,153	+ 3,324
Bolton Corporation	,, 26	2,416	2,542	+ 126	52	134,493	— 30
Bournemouth Corp.	,, 29	1,755	1,849	+ 94	52	107,845	+ 5,324
Bradford Corporation	,, 26	5,810	6,495	+ 685	52	329,766	+ 13,107
Brighton Corporation	,, 26	811	848	+ 37	51½	55,254	+ 1,191
Bristol	,, 24	8,682	8,779	+ 97	12	108,987	+ 7,781
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 25	1,386	1,454	+ 68	52	82,564	+ 3,494
Burton-on-Trent Corp...	,, 26	248	242	— 6	52	14,596	— 459
Bury Corporation	,, 26	1,194	1,212	+ 18	51½	68,801	+ 402
Cardiff Corporation	,, 18	2,403	2,634	+ 231	50	136,225	+ 310
Chatham & District	,, 23	1,012	1,042	+ 30	12	12,286	+ 733
Chesterfield Corp.	,, 23	248	257	+ 9	51	13,711	+ 179
Colne Corporation	,, 18	217	228	+ 11	...	...	...
Cork Electric	,, 23	441	456	+ 15	12	5,297	+ 73
Croydon Corporation	,, 10	1,564	1,462	— 102	49	88,607	+ 5,202
Derby Corporation	,, 25	939	1,003	+ 64	51¾	53,800	+ 2,557
Dover Corporation	,, 18	248	257	+ 9	50	15,213	+ 2,321
Dublin & Lucan	,, 24	120	100	— 20	12	1,343	— 58
Dublin United	,, 24	5,521	5,495	— 26	12	69,489	+ 4,069
Dundee City	,, 22	1,161	1,268	+ 107	44⅝	60,373	+ 3,590
East Ham Corporation	,, 25	1,259	1,174	— 85	51¾	67,097	+ 5,377
Exeter Corporation	,, 24	303	311	+ 8	51	18,805	+ 1,044
Glasgow Corporation	,, 25	20,438	20,732	+ 294	43	931,012	+ 69,697
Glasgow Subway	,, 25	1,094	1,228	+ 134	12	15,070	+ 1,835
Glossop (U. Elec. Supp.)	,, 25	110	124	+ 14	13	1,657	+ 266
Halifax Corporation	,, 21	1,933	1,932	— 1	50⅔	110,270	+ 704
Do. Motor Omnibuses	,, 21	43	31	— 12	50⅔	2,380	— 73
Hastings & District	,, 27	744	691	— 53	12	8,583	+ 7
Huddersfield Corp.	,, 25	2,401	2,540	+ 139	51	136,734	+ 17,966
Hull Corporation	,, 25	3,081	3,060	— 21	51	159,507	— 683
Ilford U.D.C.	,, 25	563	612	+ 49	51	33,007	+ 3,525
Ilkeston Corporation	,, 23	116	119	+ 3	51	6,819	+ 416
Ipswich Corporation	,, 25	389	493	+ 104	51	27,517	+ 4,965
Isle of Thanet	,, 25	259	251	— 8	25	6,281	— 1,006
Kilmarnock Corp.	,, 18	146	146	nil.	44	7,339	+ 318
Lanarkshire	,, 23	1,711	2,097	+ 386	12	25,332	+ 4,421
Lancashire United	,, 22	1,542	1,550	+ 8	12	18,693	+ 954
Leeds City	,, 25	8,114	8,657	+ 543	52	460,370	+ 37,579
Leicester Corporation	,, 25	2,820	3,224	+ 404	12	38,633	+ 5,001
Leith Corporation	,, 25	657	735	+ 78	45	34,459	+ 2,985
Leyton U.D.C.	,, 23	1,501	1,466	— 35	51	80,954	+ 8,611
Liverpool Corporation	,, 25	13,539	12,775	— 764	12½	159,451	+ 7,703
Llandudno & Colwyn B.	,, 24	203	190	— 13	16½	3,057	+ 40
London County Council	,, 8	41,974	46,556	— 4,582	49	2,167,952	— 18,076
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	,, 24	144	114	— 30	24½	3,199	— 944
Maidstone Corporation	,, 23	162	172	+ 10	51	10,760	+ 498
Manchester Corp.	,, 25	17,517	17,092	— 425	51	914,470	+ 35,173
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	,, 25	151	177	+ 26	51½	9,988	+ 757
N'castle-on-Tyne Corp.	,, 25	5,866	5,787	— 79	52	316,285	+ 28,393
Newport (Mon.) Corp.	,, 25	754	828	+ 74	52	43,546	+ 2,263
New St. Helens & Dist.	,, 22	908	834	— 74	38	37,974	+ 3,383
Northampton Corp.	,, 24	714	662	— 52	51⅔	36,772	+ 5,611
Nottingham Corp.	,, 23	3,408	3,694	+ 286	51	190,200	+ 10,325
Oldham Corporation	,, 26	2,038	2,126	+ 88	52	120,661	+ 6,606
Portsmouth Corp.	,, 25	2,082	2,047	— 35	52	124,689	...
Preston Corporation	,, 22	848	949	+ 101	51	49,869	+ 3,278
Provincial	,, 25	1,919	1,891	— 28	25½	51,155	+ 3,229
Reading Corporation	,, 23	669	734	+ 65	51½	40,160	+ 4.305
Rhondda Tramways	,, 16	1,072	1,149	+ 77	11	206,517	+ 1,026
Rochdale Corporation	,, 25	1,524	1,496	— 28	49½	86,234	+ 4,224
Rotherham Corp.	,, 29	924	1,247	+ 323	52	61,830	+ 9,172
Salford Corporation	,, 27	4.677	4,902	+ 225	51⅔	267,337	+ 13,054
Sheffield Corporation	,, 26	8,077	9,711	+ 1,634	52	476,788	+ 69,694
Southampton Corp.	,, 22	1,195	1,399	+ 204	51	76,185	+ 9,319
Southend-on-Sea Corp.	,, 22	661	616	— 45	51	39,551	— 8,385
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 18	716	707	— 9	50⅔	39,657	+ 2,031
Sunderland Corp.	,, 26	1,302	1,455	+ 153	52	77,761	+ 3,099
Sunderland District	,, 22	494	531	+ 37	21	11,728	+ 909
Swindon Corporation	,, 23	169	180	+ 11	51	9,945	+ 897
Torquay Tramways	,, 16	449	388	— 61	11	4,424	+ 141
Tyneside Trys. & Tmrds.	,, 22	513	501	— 12	12	5,774	— 192
Wallasey Corporation	,, 25	1,096	1,095	— 1	51⅔	64,307	+ 1,686
Walsall Corporation	,, 25	666	755	+ 89	13	9,426	+ 1,279
Walthamstow U.D.C.	,, 25	738	790	+ 52	52	44,888	+ 4,186
Warrington Corp.	,, 23	426	462	+ 36	51	23,882	+ 1,728
West Ham Corporation	,, 23	2,906	2,984	+ 78	51½	157,157	+ 12,465
Wigan Corporation	,, 23	1,394	1,489	+ 95	51	77,685	+ 3,341
Wolverhampton Corp.	,, 29	950	1,127	+ 177	52	58,250	+ 3,831
Yorkshire (W. Riding)	,, 26	1,448	1,499	+ 51	13	20,417	+ 2,011

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON. Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION

AND

MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,

AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 18.] LONDON, SATURDAY, APRIL 8, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF COVENTRY.

ELECTRICITY DEPARTMENT.—PLANT FOR SALE.

The Electricity Department are prepared to receive tenders for the sale and removal of:—

One 600 kw. McLaren-Siemens Generating Set.

One 600 kw. McLaren-British Westinghouse Generating Set.

The engines are triple expansion, marine type, with cylinders 22-in., 31¼-in., and 49-in. diameter, by 24-in. stroke.

The alternators are by Siemens Brothers Dynamo Works, Ltd., and British Westinghouse Co., Ltd., and are two-phase, 2,000 volts, 50 periods, 125 r.p.m.

The plant was installed as follows:—

McLaren-Siemens set in 1904.

McLaren-British Westinghouse set in 1907.

They are in first-class condition, and are being sold only to make room for plant of greater capacity.

Tenders are to reach the Town Clerk, Hay Lane, Coventry, on or before 10 a.m., April 27, 1916.

The Corporation do not bind themselves to accept the highest or any tender.

The above plant may be seen running on load by appointment, and further particulars can be obtained from

GEO. TOUGH,
Engineer and Manager.

Electricity Works, Coventry.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

MOTORS AND TRANSFORMERS.

The Electricity and Tramways Committee of the County of Warrington invite tenders for the following:—

1. Motors.
2. Transformers.

Specifications and forms of tender can be obtained from the undersigned on payment of one guinea for each specification, which will be returned on receipt of a bonâ fide tender.

Five shillings will be charged for extra copies of either specification.

Tenders, addressed to the "Chairman of the Electricity and Tramways Committee, Town Hall, Warrington," must be sealed with wax and endorsed "Tender for Motors," or "Tender for Transformers," as the case may be, and delivered not later than 12 o'clock noon on Tuesday, April 11, 1916.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS, M.I.E.E.,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

COUNTY BOROUGH OF SALFORD.

ELECTRICITY DEPARTMENT.

SWITCHGEAR.

Tenders are required by noon on Monday, April 17, 1916, for the supply, delivery and erection of three-phase extra high pressure and low pressure Switchgear for 5,000 kw. sub-station equipment. Specifications, etc., may be obtained from the Borough Electrical Engineer, Frederick Road, Salford.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee invite tenders for the following:—

1. Boiler Plant.
2. Economiser.

Specifications and Forms of Tender may be obtained from the undersigned on payment of one guinea for each specification, which will be returned on receipt of a bonâ fide tender. Five shillings will be charged for extra copies of specification.

Tenders, addressed to the "Chairman of the Electricity and Tramways Committee, Town Hall, Warrington," must be sealed with wax and endorsed, "Tender for Boiler Plant" or "Economiser," as the case may be, and delivered not later than 12 o'clock noon on Wednesday, April 26, 1916.

The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

CONTRACT NO. 35.—WATER-SOFTENING PLANT.

The above Council invite tenders for the supply, delivery, and erection of a Water-softening Plant to deal with 5,000 gallons of water per hour.

Copies of the General Conditions, Specification, and Form of Tender can be obtained from Mr. G. R. Spurr, Electrical and Tramways Engineer, Priory Avenue, Walthamstow, on depositing the sum of one pound (£1), which amount will be refunded on receipt of a bonâ fide tender, and to the successful tenderer on completion of the contract.

Sealed tenders, on the prescribed forms, endorsed "Tender for Water-softening Plant," must be delivered by post only to the undersigned not later than 5 o'clock on Wednesday, April 26, 1916.

The Council do not bind themselves to accept the lowest or any tender.

The contractor will be required to pay the whole of the workmen such rates of wages, and observe such hours of labour, as are recognised by the various Trade Unions, and in force at the time of signing the contract.

G. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow.
April 4, 1916.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

The Directors are prepared to receive tenders for Twelve Steel Carriage Underframes, 58 ft. long.

Copies of the specification, drawings, and form of tender may be obtained on application to the Secretary at Amiens Street Terminus, Dublin, on payment of a fee of ten shillings, which will be refunded on receipt of a bonâ fide tender and the return of the drawings.

Tenders, under cover, marked "Tender for Underframes," should be delivered to the undersigned not later than 10 a.m. on Monday, April 24, 1916.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
April 4, 1916.

READING CORPORATION TRAMWAYS.

SHIFT ENGINEER.

A Temporary Shift Engineer is required immediately for the above Tramways Power Station.

Commencing salary, £2 per week.

Applications should be addressed to the undersigned, and be accompanied by three recent testimonials.

G. F. CRAVEN,
General Manager and Engineer.

March 30, 1916.

BARRY RAILWAY COMPANY.

BRASS, RAILS, ETC.,

The Barry Railway Company are open to receive tenders for second-hand material, including: Brass, Rails, Heavy and Light Scrap, etc.

For particulars apply to the Secretary of the Company, Barry Docks.

Digitized by Google

TRAMWAY RAILS.

Wanted immediately.—About twenty-five tons of New British Standard Tramway Rails, Section 3C. Price and particulars to Box No. 70, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

TRAMWAY MOTORS.

Wanted.—Four D.K. 25a Tramway Motors in working order. Price and particulars to Box No. 69, The Tramway and Railway World, Amberley House, Norfolk Street, London, W.C.

POSITIONS VACANT.

SWITCHBOARD ATTENDANT.

Switchboard Attendant required for combined three-wire lighting and traction supply station. Experience in three-phase generation a recommendation, but not essential. Wages, 35s. per week, rising yearly 2s. 6d. per week to 40s. Only applications from persons whose present employers are willing to release them will be considered. Write, stating age, experience, and enclose copies of not more than two recent testimonials, to Mr. G. R. Spurr, Electrical and Tramways Engineer, Priory Avenue, Walthamstow.

SWITCHBOARD ATTENDANTS.

Switchboard attendants. Must be ineligible for the Army, or ex-Service men. Wages, 25s. per week of 56 hours. Applications, stating age, experience, etc., to J. B. Feltham, A.M.I.E.E., Engineer and Manager, Electricity Works, Mexborough, not later than April 5, 1916.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 8488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

DOCKERS' SUPERFINE PAINTS
and
EXTRA DURABLE VARNISHES
for
TRAMCARS.

DOCKERS' "HERMATOR" PAINTS AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

— (NATURAL, GLAZE, DULL FINISH, OR COLOURED) —
in twill, straight, or fancy weaves, canvas backed or unbacked, is

BRITISH MADE THROUGHOUT

from the splitting of the cane to the finished article.

We hold **LARGE STOCKS OF RAW MATERIALS** and can GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World
Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, APRIL 8, 1916.

OXY-ACETYLENE WELDING.

Managers of tramway undertakings who have introduced the oxy-acetylene welder and cutter into their equipment will have found it invaluable during the present scarcity of labour. The dearth of workmen is not confined to this and other nations actively engaged in the war, but is apparent even in the United States owing to the activity in the manufacture of war materials for Europe. Reports recently published in the New York *Electric Railway Journal* on the use of this labour-saving device in connection with American electric railways, show that its importance can hardly be over-estimated. The chief reason is that much of repair shop work consists in the restoration of broken parts, which otherwise could be replaced only after much dismantling is done, afterwards involving much machine work. For such work welding in some cases permits the fusion of broken parts without their removal from the car, making it unnecessary to purchase and carry in stock many of the most expensive of repair parts. A picturesque way of summing up the advantages is that in many instances store-rooms have been replenished from the scrap heap. Armature bearing, housings, and frame heads, are successfully welded, and in many cases more satisfactory results are obtained than if new parts are purchased. Worn axle-seats for motors have long been built up, and now worn axle caps are being reclaimed from the scrap heap. Worn and cracked armature bearings are made as good as new at a considerable saving, while the life is increased one hundred per cent. The restoration of worn pinion seats and keyways is common, the saving being great, besides reducing to a minimum the number of extra armatures necessary to meet emergencies. A very unusual application of welding is for the lengthening of coupler knuckles, to prevent cars uncoupling owing to abnormal track surface conditions, truck-spring deflections, and wheel wear. A rivet-cutting torch enables rivet heads to be cut at the rate of three per minute. In one instance, a 7-in., 13½-lb. channel intermediate sill in an all-steel car was badly twisted in a wreck. Under ordinary conditions it would have required two or three days to cut out this bent sill and needle beam, but with the oxy-acetylene torch the damaged portion was quickly cut at two places and removed. In a very short time the parts had been straightened in the forge shop ready to be replaced. Worn journal boxes are no longer scrapped, but are reclaimed by welding sheet-steel chafing plates in the pedestal ways. A casting used in connection with third-rail shoe mechanism was broken in service and was practically impossible to replace promptly because of slow deliveries of steel castings. The repair was accomplished by welding. In twenty minutes a sand-box that had been broken at the spout was repaired and replaced in the car, which would otherwise have been kept without sand for five weeks owing to the difficulty of obtaining a new box. Common welding operations by one company comprise the repair of heavy broken parts, such as truck frames, drawheads, brake hangers and body bolsters, and even for broken stoker castings. A novel application of the oxy-acetylene flame is the burning of lead to make lining material for storage-battery boxes. Many electric railways use both the electric-arc and the oxy-acetylene flame in their repair shops, dividing the work between the two in accordance with their individual advantages. While the electric arc is not really a portable outfit, the oxy-acetylene apparatus is self-contained and lends itself readily to use as a portable tool.

TRAMWAYS AND THE MUNITIONS ACT.

The Ministry of Munitions have issued the following statement explaining the effect of certificates granted under Section 9 (1) (d) of the Munitions of War (Amendment) Act, 1916, to undertakings supplying light, heat, water, power or tramways facilities: —The Minister of Munitions has power under Section 9 (1) (d) of the Munitions of War (Amendment) Act, 1916, to certify the supply of light, heat, water, or power or tramways facilities to be of importance for the purpose of carrying on munitions work. In cases where such certificate is granted the work of the undertakings providing the supply will be "munitions work." The effect of granting a certificate will be that the undertaking will be subject to the provisions of Part I. of the Munitions of War Act, 1915, which prohibits strikes and lock-outs. It would also be legally possible to declare certified undertakings to be controlled establishments under Section 4 of the Munitions of War Act, 1915. The question of controlling such undertakings has from time to time come under the consideration of the department, and may again require to be considered in the future. As at present advised, however, the department does not propose to take this course in the case of the undertakings with which this Note deals. The provisions of the Munitions of War Acts as regards leaving certificates will apply to undertakings so certified in so far as such undertakings are covered by the terms of the Minister's Order set out in Appendix I. of the accompanying memorandum. The question whether a particular undertaking or part of an undertaking is covered, can be settled in case of dispute only by reference of a particular case to a Munitions Tribunal.

MUNICIPAL ELECTRICAL CONFERENCE.

The twenty-first annual general and other business meetings of the Incorporated Municipal Electrical Association will be held on June 22 and 23 at the Institution of Electrical Engineers, London. On the first day the programme will be as appended :—

10 a.m. (1) Presidential address. Mr. Alex. C. Cramb, borough electrical engineer, County Borough of Croydon.

(2) Paper on "Boiler house design," by Mr. W. W. Lackie, past president, engineer and manager, Glasgow Corporation Electricity Department.

2.30 p.m. (1) Paper on "Area of supply from an economic standpoint," by Mr. H. S. Ellis, borough electrical engineer, South Shields.

(2) Paper on "The application of electric power to agriculture," by Mr. W. T. Kerr, city electrical engineer, Hereford.

On the second day the routine business will be transacted.

Digitized by Google

THE BUDGET AND LOCOMOTION.

Among the new taxes submitted to the House of Commons by the Chancellor of the Exchequer on April 4, in connection with the expenditure on the war, was a revised scale of licence duties on motor cars and motor cycles. As regards cars the new scale is as follows:—

Horse Power.	Present Duty. £ s. d.	Proposed Duty. £ s. d.
Not over 6½ . . .	2 2 0	4 4 0
6½ to 12	3 3 0	6 6 0
12 ,, 16	4 4 0	8 8 0
16 ,, 26	6 6 0	18 18 0
26 ,, 33	8 8 0	25 4 0
33 ,, 40	10 10 0	31 10 0
40 ,, 60	21 0 0	63 0 0
60	42 0 0	126 0 0

Motor cycles not exceeding four-horse power will pay £2 2s., and above four-horse power three-quarters of the duty chargeable on motor cars of like horse-power. The revenue from these two sources is estimated this year at £800,000.

A duty was also proposed on railway fares as appended:—

All journeys wholly or partly by rail beginning in the United Kingdom and ending in the British Islands: Single fares from 9d. to 1s.—1d.; single fares over 1s., and all fares (single or return) over 1s. 6d.—1d. for every shilling or part of a shilling.

All journeys wholly or partly by rail beginning within the United Kingdom, but ending outside the British Isles: First-class fares, 4s.; second-class, 3s.; third-class, 2s.

The yield of this duty is expected to amount to £3,000,000.

On excess profits the tax was raised from 50 to 60 per cent.

As the result of representations made to the Government concerning the hardships entailed by the imposition of double income-tax within the Empire, a matter of importance to many tramway companies, the Chancellor of the Exchequer said the question would have to be dealt with in the promised reconstitution of our income tax law. For the present all he could do was to leave the matter where it stood—(laughter)—and content himself, where the Dominions tax was not less than 1s. 6d., with not imposing any further burden. Persons affected would be entitled to claim repayment of the additional rate now imposed.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council on Tuesday some discussion took place on the reports of the Highways and Housing Committees with reference to the closing of certain London stations on the South-Eastern and Chatham Railway, and the ability of the tramway service to meet the needs of the working people thus inconvenienced.

Replying to Lord Haddo, Mr. G. H. Hume (Chairman of the Highways Committee) said a census had been taken to see whether the tramways could accommodate the workpeople who used the Walworth Road and Camberwell Stations. At Brixton Station the last two workmen's cars and trailers *via* Blackfriars had 256 passengers, with seating accommodation for 284; the last two workmen's cars and trailers *via* Westminster had 158 passengers with seating accommodation for 284; at Camberwell Gate the last four workmen's cars (one car on each service) *via* Blackfriars had 346 passengers, with seating accommodation for 352; the last two workmen's cars *via* Westminster (one on each service) had 128 passengers and seating for 152.

Mr. Bernard Holland (Chairman of the Housing Committee) explained the representations made to the Board of Trade, and said their case was not particularly strong. The census taken by the Highways Committee showed they were capable or very nearly capable of dealing with the extra traffic thrown on the tramways. Perhaps the rush in the last half-hour was the most difficult to deal with, and it was suggested that during this particular period tramcars might stop at Walworth Road Station. But the Board of Trade seemed to think if they opened the station for half an hour they might as well open it all day. They did not get much encouragement from the Board of Trade, and that was how matters stood at present.

The reports were received.

"SAFETY FIRST" CAMPAIGN FOR LONDON.

At the monthly Operating Department efficiency meeting of the Underground Railways and the London General Omnibus Group, held under the presidency of Mr. H. E. Blain, the operating manager, Mr. Percy Lake, of the Claims Department, read a paper on "Safety First." In addition to representatives of the Railways and Omnibus Companies, the attendance included Messrs. A. H. Pott (London United and Metropolitan Electric Tramways), Mr. W. E. Hammond (Metropolitan Electric Tramways), Mr. A. V. Mason (South Metropolitan Tramways), and Mr. J. B. Mackinnon (London United Tramways). There was first an exhibition of the L.G.O.C. training film, which has special bearing upon the prevention of accidents. Mr. Lake gave an interesting account of the inauguration of the safety movement on American railways, and its introduction in this country by the Great Western Railway, whose brochure had been copied by the London and South-Western Railway, with the addition of a chapter illustrating the dangers of the live rail. Both the Glasgow Corporation Tramways and the London General Omnibus Company had, immediately prior to the outbreak of the war, intended to proceed with a safety campaign, but the operations of both had been suspended. It was now intended by the London transit companies to press on with the movement. By means of charts Mr. Lake showed the marked influence on the number of accidents, of attention paid to training methods and the inculcation of safety tenets by the companies. The omnibus accidents had decreased by no less than 44 per cent. during the last two years, despite the increased dangers of darkened streets and other war conditions. The campaign would include advertisements in the public press, the exhibition of striking notices on the staircases of public vehicles, the issue of special pamphlets addressed to children, cyclists, pedestrians, etc., and the use of cinema films. An interesting discussion followed, and the staff were invited to forward suggestions. Already a considerable number have responded. The next efficiency meeting will consider a paper on "The Graphic Presentation of Operating Data."

MISCELLANEOUS NEWS AND NOTES.

Sheffield Tramways Collection.—The collection on the Sheffield tramcars, organised by Mr. A. R. Fearnley, the general manager, for Sheffield men who are prisoners of war in Germany, realised £500.

Additional Power Plant for West Ham.—The Electricity Committee have recommended the expenditure of the following sums:—Cables, £11,000; transformers, £5,000; mains, £3,000; additions to the generating station, £3,275; linking up connections, £4,500.

The Recent Air Raids.—During an air raid on a north-east coast town on Saturday, April 1, a bomb struck a tramcar. At this time all the cars were stationary, the traffic having been stopped immediately the alarm was given. A tramway inspector was killed and a woman conductor had part of her leg torn off.

Objection to a West Riding Postponement.—Stanley Urban Council have expressed to the Board of Trade their objection to the application of the Yorkshire (West Riding) Electric Tramways Company for an extension of the period to March 19, 1918, for the construction of tramways from Wakefield to Alverthorpe, and portions of the lines from Rothwell to Oulton, and to Ardsley.

Earlier Traffic Closing at Nottingham.—From April 4 the last cars will leave for their destination at 10.30 p.m. and it is hoped that they will all be housed by 11 o'clock. This is in consequence of the earlier closing of the market and of shops because of the Lighting Order, and the necessity for having the streets in darkness in the event of an air-raid warning.

Spanish Tramway Project.—The Société des Mines et Hauts fourneaux has begun work on the narrow gauge railway to connect Motril and Orgiva. It is considered probable that when this railway is completed the Tramway Company at Granada will open a new tramway line between Granada and Orgiva, so bringing the port of Motril within easy reach of Granada.

Volunteer Motormen at Bradford.—Six volunteer motormen, representing various grades of society, are engaged on the Bradford cars on Saturdays and week-ends. Others are undergoing training. The department have lost about 500 men through enlistment and transfer to Government work. Of the men who entered the forces 14 have been killed in action and 19 wounded, while five are prisoners of war in Germany.

Newcastle and Halfpenny Fares.—A sub-committee has been appointed by the Tramways Committee to go into the question of the need for increased revenue. Over 50,000 halfpenny fares are issued weekly, and it is suggested that these, together with other reduced rates, may have to be revised. The Committee have been informed that the increased cost of labour and material is absorbing practically all the profit.

Glasgow Motorman sent to Prison.—The Glasgow Sheriff on March 31 investigated the charge brought against a Corporation tramcar driver for having on January 2 driven a car in a culpable and reckless manner, and at an excessive rate of speed and without having it under proper control, in consequence of which the car left the rails, overturned, and collided violently with a wall, whereby 62 persons were severely injured. The Sheriff ordered the accused to undergo a month's imprisonment.

Welfare Work at Southampton.—Mr. W. T. Robson, the new general manager of the Southampton Corporation Tramways, has for the third time in his association with tramway undertakings, induced the employees to raise bulbs and exhibit the blossoms. At Southampton show the prizes were distributed by Mrs. Dunsford (wife of Alderman F. A. Dunsford, chairman of the Tramways Committee), who remarked that no doubt in time they would all feel grateful to Mr. Robson for introducing so excellent a hobby.

Competition in East Ham.—Alderman M. Oakes, chairman of the Tramways Committee, has informed the East Ham Council that in the first week of the new fare stages the receipts increased by £900. That continued until the omnibuses started the same fares, and even a little longer. A more direct effect was the increased service of omnibuses. Another thing that had lately reduced the takings was the early closing. Following the last raid, the tramway service was practically finished when the public-houses were closed.

An Improved Solid Tire.—The Goodrich Company, who a short time ago brought out their "P.B." (protected base) band tires in inch sizes, have just put upon the market tires in millimetre sizes. The makers consider that the advantages to be obtained from the new type are so important that they will have a marked effect upon the future type of all band tires. Some of the characteristics of the new type are easy application, greater strength, better union between rubber and steel, and better protection to the hard rubber base.

Digitized by Google

Russian Electric Railway Projects.—Owing to the war the promotors of the Petrograd Northern Electric Railways Company and the Petrograd Electric Auxiliary Railways Company have been unable to comply with the stipulation that 50 per cent. of the share capital should be paid up not later than the year 1915. The Ministers of Finance and Communications have agreed to allow the condition to take effect one year after the ratification of peace. The schemes now await confirmation by the second department of the Imperial Council.

Electric Tramway Material.—The Imperial Trade Correspondent at Auckland (Mr. A. J. Denniston) reports that a tramway company in South Australia has decided to raise the sum of £60,000, of which it is proposed to use £50,000 in electrifying the existing steam tramway. United Kingdom electrical engineers and contractors may obtain the name of the company on application to the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C. In making application the reference number (122) should be quoted.

Supply of Rails, Fishplates, and Tires.—With a view to securing a supply of rails during the next twelve months the Special Committee of the Tramways and Light Railways Association have asked members to supply the secretary with a statement showing the minimum quantity of rails and fishplates required by them to keep their undertakings in operation. Application will be made to the Ministry of Munitions for permission to have the supplies prepared and delivered. There will be no alteration in the price for steel tires during the present quarter.

Tramways Power Supply.—In connection with the supply of power to West Ham Corporation Tramways, the Electricity Committee have adopted a coal clause, which will be operative as from November 1 last. In 1913, when the charge for energy was fixed at 0.75*d.* per unit, the price of coal was only 11*s.* 6*d.* per ton. A deficiency of £16,000 on the working of the electricity undertaking is estimated for the year ended March 31 last, including £4,300 allowances to men on active service. As and from April 1 Southampton Electricity Committee are increasing the charge for power supplied to the tramways by 10 per cent.

Huddersfield Tramways Grant to the Rates.—The new borough rate shows a total of 4*d.* in the pound less than last year. From the tramways profits a sum equal to 4*d.* in the pound, and from the electricity profits one penny in the pound were taken. A labour councillor deprecated the taking of £8,600 from the tramways profits, and urged that the working classes, who were the chief supporters of the cars, ought to be given cheaper fares. The reply of the chairman of the Finance Committee was to the effect that the amount drawn from the rates by the tramways years ago had not yet been repaid. When this was straightened they could consider the users.

Motorman Killed by his Car.—At 5.20 a.m. on April 4 the motorman of a Leeds Corporation tramcar alighted to move the points at the junction of Beckett Street and Harehills Road without bringing the car to a standstill. He slipped and failed to get clear of the car, which knocked him down, dragging him for several yards. An inspector witnessed the accident, and after shutting off the power he proceeded to extricate the motorman. When the body was taken from beneath the lifeguard the unfortunate man was found to be dead. At the inquest, on April 6, Motor Inspector McDonald stated that deceased should have brought the car to a standstill before he left it. A woman conductor said that hitherto deceased had always stopped the car before altering the points. On this occasion it was travelling at a crawling pace. The jury returned a verdict of accidental death.

Military Tribunal Cases.—A Birmingham motorman applied for exemption from military service on the ground that in driving a tramcar he was contributing his share to the service of the nation. Asked if he could not do ambulance work, he said his nerves "would be off." The Military Representative said if that were so he should object to a person like the applicant driving for the Corporation. The claim was not allowed. A Dundee conductor claimed as a conscientious objector and also on the ground that as an Irishman he was entitled to the same treatment as men in Ireland. The Sheriff, in dismissing the application, said the Act did not state that Irishmen were exempt. It said that the Act did not apply to Ireland, which was a different thing. At Newcastle, Mr. E. Hatton, the tramways engineer and manager, opposed the claim of an apprentice for a leaving certificate from the department. The clerk said the Corporation had no option but to allow the lad to go as he was not working on munitions. Mr. Hatton pointed out that the cars were carrying munition workers. The chairman and clerk told the lad that he would sacrifice his future career by leaving, but the applicant insisted on having a leaving certificate, and was granted one which certified that he was not employed on munitions.

Omnibus Inspectors and Military Service.—Sir C. Kinloch-Cooke asked the Under Secretary for War in the House of Commons on April 5 whether he was aware that a number of men of serviceable age were employed by the London omnibus companies as inspectors; that these men merely overlooked the work done by conductors; if, as had been proved possible, women could do the work of men conductors, he would consider if women could do the work of these inspectors and so release them in order that, if married, they might attest for the Army, and if unmarried and passed as unfit, they might be employed in munitions work; and, if so, whether he proposed to take any action in the matter. Mr. Tennant in reply said that an inspector of omnibuses who was unmarried and of recruitable age was liable for military service under the Military Service Act. In regard to such men, he did not see what action other than such as was already provided for remained to be taken. The inspectors of omnibuses of recruitable age who were either married or had been passed unfit for military service were free to attest in the one case or enter munitions works in the other case if they so desired, but the Army Council had no power to require them to leave their employment as inspectors of omnibuses. He did not see that inspectors of omnibuses were as a class in any different position in regard to this matter from others, and if any action were to be taken there was no reason why it should be confined to inspectors of omnibuses.

Permanent Way at Leicester.—Mr. E. G. Mawbey, borough engineer and surveyor, in his annual report to Leicester Corporation Tramways and Electricity Committee, says that the cost of maintenance and repair work showed a diminution due to economies effected owing to the war. The expenditure in 1915 was £5,931, as compared with £6,408 in 1914 and £6,056 in 1913. Various new points and crossings were fixed during the year, and a number of curves and junctions relaid with heavy silicon steel rails. The mileage of track in operation was increased by the opening of the King Richard's Road route on September 23. The widening of the Haymarket and Belgrave Gate, and the doubling of the track through this portion of the Belgrave route has resulted not only in greatly facilitating the traffic, both tramway and general, but has enhanced the appearance of the centre of the town. The length of rails ground during the year for the removal of corrugations was 11,055 yards, at an average cost of 1.365*d.* per yard. The cost was about one-third that of the previous year. Although the track is in very good order, considering that it has had nearly twelve years' service, Mr. Mawbey considers that it will require careful watching, as it has reached a critical period. A fair stock of rails bought before the great rise in prices is in hand. The car repairing shops have been put into commission during the year. A new mess room and other buildings have been erected, and the premises at the Humberstone Gate offices have been adopted for the use of women conductors. The superintendent's house at the main car depôt has also been used for the same purpose.

Edinburgh Tramways.—The Edinburgh cable system was recently the subject of a lively discussion by the Town Council. Messrs. Allen and Crichton brought forward the following motion:—"(1) To discontinue negotiations with the Edinburgh and District Tramway Company regarding the extension of the lease, or the taking over of the Company's rolling-stock. (2) At the end of the present lease to keep the running of the tramway cars in the Corporation's own hands. (3) The cars in future to be on the electric system. (4) Immediate steps to be taken to carry out these resolutions, so as to ensure as little inconvenience as possible to the users of the tramway cars." The Town Clerk stated that there was no negotiation, proposal, or thought of continuing the lease. The Council were determined to keep the running of the cars in their own hands at the end of the lease, and he suggested that all these questions should be remitted to the Tramways Committee for consideration. Mr. Allen said that they were within three years of the termination of the lease, and the nearer they were to the finish the more they were in the hands of the company. He wished to bring up this matter sharply, so that both the Council and the citizens could have an opportunity of expressing their views. Mr. Harrison, convener of the Tramways Committee, in reply said that the committee had resolved, with the consent of the Council, that a report, giving all the information safe to give at present should be drawn up. They would lay the report before the Council and it could be discussed either in public or in private. A discussion followed as to whether the motion should come up at the next Council meeting or should be remitted to the Tramway Committee. Ultimately the latter course was adopted by 21 votes to 18.

Provision for Repairs and Renewals.—During the introduction of the Leeds municipal budget on March 30, Alderman C. H. Wilson, chairman of the Finance Committee, stated that owing to the war there had been a reduction of expenditure by about £50,000, including £20,000 on the tramways, £17,000 for lighting, and £13,000 for the highways. The tramways profits for the year just ended was £91,000, but £20,000 of the sum was money that had not been spent on plant. The amount estimated for the repair of cars had practically been spent, but only £3,000 of the £23,000 allowed for track renewals had been paid out. The estimate for general repairs and maintenance was £43,040, or slightly more than last year, therefore there was no intention to diminish expenditure in this way. In addition to permanent way renewals it would be found that a sum of practically £3,000 was carried to a reserve fund to cover third-party risks. The Tramways Committee were paying in war allowances practically £23,000, a payment which would automatically cease when the war was over, leaving the money available, without diminishing profits, for repairs and renewals. He wished the Council could see their way to hand over the care of the highways to the Tramways Committee, and he thought the matter would be brought to the front when the war was over. Thousands of pounds could be saved if the change was made. Replying to an inquiry whether he was sure about the safety of the tramways track, Alderman Wilson said the track was laid on concrete and required packing from time to time. There might be inconvenience at present, but no danger. Councillor Laycock observed he could not admit that the whole of the £45,000 paid in allowances to those who were serving with the forces would after the war go immediately to the benefit of the town. Alderman Wilson was carrying forward a surplus of £12,000. That was the only item they had in reserve to meet the accumulated back work on the highways and the tramway track.

Digitized by Google

PERSONAL.

Mr. G. H. Hume, chairman of the Highways Committee, has been appointed as the representative of that Committee on the General Purposes Committee, London County Council

Mr. H. Pilling, general manager and engineer of the Accrington Corporation Tramways, has been granted an increase in salary of £50 by the unanimous vote of the Town Council.

Mr. Harold Parsons has been appointed chairman of the Stores and Contracts Committee of the London County Council, and he has also been appointed as the representative of that committee on the General Purposes Committee.

Mr. J. S. Highfield, chief engineer and manager, Metropolitan Electric Supply Company, and three directors have resigned in consequence of disagreement as to the policy of dealing with the power load. A shareholders' committee has been appointed.

Dr. J. T. Merz, one of the founders of the Newcastle Electric Supply Company has resigned from the chairmanship, a position he had held since 1901. Tributes to his work were voiced at the annual meeting by Mr. J. H. Armstrong, the new chairman, and Dr. G. B. Hunter.

Alderman H. W. Littler, the chairman of the Tramways and Electricity Committee of West Ham Corporation, has resigned his membership of the Council. The Committee have passed a resolution expressing high appreciation of his services in the development of the two undertakings.

Mr. E. G. Moggridge has been appointed by the Board of Trade to the position of assistant secretary of the railway department of the Board of Trade, in place of Mr. W. F. Marwood, who has been appointed second secretary to the Board. Mr. Moggridge was formerly assistant secretary to the marine department. Mr. C. Hipwood becomes assistant secretary of the marine department in place of Mr. Moggridge.

Mr. C. P. Sparks has been nominated for a second year as President of the Institution of Electrical Engineers, Mr. J. S. Highfield for re-election as Vice-President, and Mr. R. A. Chattock as a new Vice-President. Mr. J. Devonshire, of the allied Tramways Companies in London, and Mr. J. O. Callender, assistant manager of Callender's Cable and Construction Company, are nominated by the Council for vacancies as Associates on that body.

Mr. A. L. C. Fell, the chief officer of the London County Council Tramways, has just passed through a very serious and critical illness. He is now approaching convalescence, but it will be some two or three months before he can resume duties. Meanwhile his place will be taken by Mr. J. K. Bruce, the deputy chief officer of tramways, particularly as one of the representatives of the Council on the Rolling Stock and the Permanent Way and Building Conciliation Boards.

CONTRACTS AND ORDERS.

The Motor Rail and Tramcar Company, Ltd., Lombard Street, E.C., have supplied a number of petrol tractors to the War Department.

Four Omnibuses for Lancaster.—The Electricity and Tramways Committee have decided to purchase four Edison battery chassis, which will be fitted with omnibus bodies by the Brush Company.

West Ham Council have been recommended by the Electricity Committee to extend for two years the contract of the British Westinghouse Company for the supply of transformers, with the addition of a sliding scale based on the cost of material and labour.

Southampton Tramways Committee have accepted the following tenders for annual supplies:—screws and files, Messrs. Dibben and Son; petrol, Messrs. Burt, Bolton and Hayward; cresote oil and carminette, Messrs. J. C. Munday and Co.; transfers, Messrs. Butcher and Co.

Motor Vehicles for Halifax.—In order to meet the needs of the motor omnibus department, Halifax Tramways Committee have recommended the Corporation to purchase two 3-ton Daimler chassis at £1,488. The purchase is also advised of a standard 2-ton Edison battery chassis, complete with electrical tip body, at £977, for the removal of ashes from the electricity works.

Salford Electricity Committee have accepted the following tenders:—Two 1,000 kw. rotary converters, British Westinghouse Electric and Manufacturing Co., Ltd., £5,590 (including £400 for contingencies); one 500 kw. rotary converter, General Electric Co., Ltd., £1,579 15s. (including the sum of £100 for contingencies); two water-tube boilers, superheaters, economisers, induced-draught plant, mechanical stokers, flues and chimneys, Babcock and Wilcox, Ltd., £11,544 (including £500 for contingencies).

Salford Tramways Committee have accepted the tender of Scholey & Co., Ltd., 56, Victoria Street, London, for a supply of steel tires, at £1,055, and that of Brown-Bayley's Steel Works, at £932 10s., also for steel tires. The following contracts for annual supplies have been placed:—

Car Accessories (Mechanical).—W. J. Ritchie & Co., National Rail & Tramway Appliances Co., and Anti-Attrition Metal Co.

Ears, Frogs, Pull-offs, &c.—British Insulated & Helsby Cables, Watlington & Co., J. Hall, and British Westinghouse Co.

Iron and Steel.—J. Kidd & Sons, and Vickers Limited.

Special Car Accessories.—British Westinghouse Co.

Wire, Solder, Lead and Tin.—British Insulated & Helsby Cables, L. Andrew & Co., R. Johnson, and Clapham & Morris.

Special Paints and Varnishes.—Nobles & Hoare.

Trolley Cord.—L. Andrew & Co.

Car Accessories (Electrical), Insulating Materials, &c.—W. McGeoch & Co., W. T. Henley's Telegraph Works Co., General Electric Co., L. Andrew & Co., British Westinghouse Co., Micanite & Insulators, Ltd., North British Rubber Co., Griffiths Bros. (insulating varnishes), C. Macintosh & Co., British Insulated & Helsby Cables, Siemens Bros Dynamo Works, Le Carbone, Ltd., H. Norbury & Co., Gabriel & Co., and W. Boydell & Sons.

FINANCIAL REPORTS AND MEETINGS.

Falkirk and District Tramways Company.—The report states that the net revenue for the year, including £674 brought forward, was £5,813. A dividend of six per cent. has been declared and £726 carried forward.

L.C.C. Tramway Receipts.—The tramway receipts from April 1, 1915, to March 22, 1916 (fifty-one weeks) were £2,255,635, a decrease of £24,989 as compared with the corresponding period of last year. For the two weeks ended March 22, the number of passengers was 20,366,150, a decrease of 2,072,780 over the corresponding period of 1915, while the receipts were £87,683, a decrease of £6,912. The route mileage was 141.67 miles.

Oldham, Ashton and Hyde Electric Tramways.—The report for 1915 states that the revenue amounts to £34,823 (compared with £33,398). The expenditure (including £1,600 for debenture interest and £1,500 placed to renewals account) amounts to £25,062 (compared with £26,024), leaving a net profit of £9,761 (compared with £7,374). Added to £1,021 brought forward, available balance is £10,782. The directors propose to place to reserve fund £3,000, a dividend at the rate of six per cent. per annum on the ordinary shares and to carry forward £2,282. The ordinary dividend has been six per cent. for twelve years past.

Bradford Tramways in 1915-16.—Mr. C. J. Spencer, general manager of the Tramways Department, has presented to the Tramways Committee approximate figures relating to the financial year just concluded. The total receipts amounted to £334,315, an increase of £14,921, or 4·7 per cent. The car mileage amounted to 6,199,601, a decrease of 172,109 or 2·75 per cent. compared with the previous year. The decrease was due to a shortage of men and of stock. Notwithstanding the large withdrawal of men who had joined His Majesty's forces the number of passengers—seventy-four millions—exceeded that of the previous year by four millions. There was an increase of 230,000 units in the consumption of electricity, representing roughly a cost of £1,000. The larger number of passengers carried and the heavier loads borne by the reduced number of cars in service account in part for the greater consumption of electricity. The wage bill amounted to £129,313, an increase of £9,182. War bonus totalled £7,102, and allowances to dependents of employees serving in the forces, £7,352. With regard to the expenditure Mr. Spencer states that certain important returns are not yet available.

Remarkable Year at Leeds.—A statement issued on April 3 by Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways, shows that the receipts for the year ended March 31 were £41,150 in excess of those for the year 1914–15, although the car miles had decreased by 117,616, or 1·23 per cent. Owing to the large number of motormen and conductors who have joined the forces, the department were unable to utilise fully the stock of cars. In the number of passengers there was an increase of 7,814,533. The extension of the tramways in the Wharfdale district added 1[illegible],000 to the population served by the tramways. Appended is a comparative table:—

	Year ended March 31, 1916.	Year ended March 31, 1915.	Increase + Decrease —
Receipts...	£475,661	£434,510	£41,150/11 + (9·47% +)
Miles run	9,405,121	9,522,737	117,616 — (1·23% —)
Passengers	103,453,801	95,639,266	7,814,533 + 8·14% +)
Receipts per mile	12·138*d.*	10·951*d.*	1·187*d.* +
Average fare paid per passenger	1·080*d.*	1·075*d.*	(10 84% +)
Population served	542,000	525,000	17,000 + (3·23% —)
Times population carried	191	182	9 + (4·94% +)
Amount paid per head of population	17/2	16/4	10*d.* + (5·10% +)

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended March 25, the latest period for which full returns are available, give total receipts of £171,431, or £8.253 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £72 11s. 7*d.* per mile of single track, and last year at the rate of £71 4s. 6*d.*, thus showing an increase for the week of £1 7s. 1*d.* per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Apr. 6.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	67¼	64½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	68/1½	75/-
4%	4%	Do. 4% Deb. ...	100	91	73½	73
4½%	4½%	Do. 4½% Deb. ...	100	98½	73	74
5%	5%	Do. 5% Deb. ...	100	96	77¼	77½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92¾	92¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10 5/16	10 5/16
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97	97
$½	$1	Brazilian Trac. & Power Ord....	$100	66	56	52¾
$1½	$1½	Do. 6% Cum. Pref.	$100	97	91½	92
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 13/16	6⅝
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91¼	91¼
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	37½	37
5%	5%	Do. 5% Cum. Pref.	100	103	51½	51½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	61¼xd	64xd
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	70½	71
70/-	70/-*	Do. 7% Pref.	100	55½	44½	44½
—	—	Do. 6% Pref. Ord.	100	17½	15¼	16
—	—	Do. Def. Ord.	100	11	9⅜	9⅜
5%	5%	Do. 5% Deb.	100	92	78¼xd	80½xd
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70¼	69½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	90	87⅞
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¼	6 11/32	6 5/16
1/3	1/3	City of B.A. Trams.	5	5½	93/9	91/10½
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11⅜	11 1/16
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	6/-	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/6	2/3
6d.	6d.	Do. 5% Pref.	1	9/16	8/7½	8/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	55½	55½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	87½
5%	5%	Do. 5% Inc. Deb.	100	88½	78	78
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48½	48½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/6	98/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	65	70½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78¾	78¾
$1¾	$1¾	Mexico Trams. Common ...	$100	70	22¾	23
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40¼	37½
6%	6%	Do. 6% Mt. Bds.	100	76	32½	35
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/2*	1/2¾*	National Steam Car	1	15/32	12/-	11/6
9⅜d.*	9⅜d.*	New General Traction	1	½	7/9	7/9
6d.	8⅜d.	Northern Gen. Trans. Ord. ...	1	25/32	16/-xd	16/-xd
6/-	5/-	Para Elec. Rlys. Ord.	5	4¼	55/-	60/-
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	11/3	11/3
8d.	10d.	Provincial Trams. Ord.	1	¼	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87xd	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	90¾	89⅜
5%	5%	1st. Mt. 5% 50 yr.	100	89½	73¼xd	76½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	88½
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	79½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76½xd	76½xd
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Increase or Dec.
Anglo-Argentine	Apr. 1	£51,093	£50,588	14	£659,910	— £1,859
Auckland.....(28 days)	Mar. 10	19,907	20,711	36	189,937	+ 3,002
Ballarat and Bendigo ...	Jan. 30	3,388	3,399	44	36,331	— 2,761
Brazilian Traction Mlrs.	Feb.	5,797,500	6,079,000	9	12,509,000	+ 715,310
Brisbane	Feb.	34,050	30,320	9	62,600	+ 6,390
British Columbia.....$	Feb.	558,512	572,935	35	4,405,030	— 792,876
Buenos Aires Lacroze ...	Mar.	44,332	42,219	39	372,882	— 6,594
Burmah Tramway ... Rs.	Apr. 1	3,625	3,566	35	...	+ 7,179
Calcutta.....Rs.	,, 1	62,078	64,334	14	888,248	+ 52,297
Cape Town	Jan.	...	16,030	...	...	...
Carthagena & Herrerias..	Mar.	2,436	2,991	13	7,417	+ 2,255
Cordoba	Jan.	11,945	12,329	44	136,477	+ 5,102
East India	Mar.	1,846	2,196	35	16,590	+ 1,214
Hong Kong .....$	Mar. 4	10,840	11,087	13	127,252	+ 14,897
Kalgoorlie	Jan.	2,372	2,236	5	2,236	— 136
La Plata	Feb.	4,016	4,346	9	8,879	+ 331
Lima	Feb.	30,164	32,900	9	66,914	+ 3,707
Lisbon .....Escu.	Jan.	...	183,882	...	...	...
Madras (2 weeks).....Rs.	Mar. 31	32,858	33,302	13	188,291	+ 19,204
Manila .....$	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Jan.	62,729	69,879	5	69,879	+ 7,150
Mexico .....$	*	...	...	...	...	...
Montevideo	Feb.	30,008	32,502	17	126,466	+ 8,313
Port Elizabeth	Jan.	...	4,193	...	...	...
Puebla Tramway.....$	*	...		...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai .....$	Feb. 23	26,704	24,573	...	...	...
Singapore .....$	Mar. 4	11,384	11,952	9	109,457	+ 14,426
Toronto.....$	Feb.	767,326	846,256	9	1,752,606	+ 141,929
Winnipeg	Feb.	314,658	293,250	9	590,810	— 74,530

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	Mar. 28	£319	£327	+ £8	52	£18,459	+ £1,611
Aberdeen Corporation...	,, 29	1,508	1,612	+ 104	43	76,771	+ 4,839
Accrington Corp.	Feb. 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	Apr. 1	254	246	— 7	47	16,345	+ 1,106
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 2	1,257	1,438	+ 181	52	72,202	+ 6,758
Birmingham Corp.	Mar. 31	6,344	12,379	+ 6,035	52	762,341	+ 123,799
Do. Motor Omnibuses	,, 31	337	575	+ 238	...	43,077	+ 19,990
Blackburn Corp.	,, 29	1,117	1,016	— 101	1	1,016	— 101
Blackpool & Fleetwood.	Apr. 1	499	351	— 148	13	4,060	— 83
Blackpool Corp.	Mar. 30	488	683	+ 195	52	78,837	+ 3,458
Bolton Corporation	Apr. 2	2,755	2,763	+ 8	1	1,059	— 765
Bournemouth Corp.	,, 5	2,000	1,594	— 406	1	1,594	— 1,042
Bradford Corporation ...	Mar, 26	5,810	6,495	+ 685	52	329,766	+ 13,107
Brighton Corporation ...	Apr. 2	991	938	— 53	1	938	— 53
Bristol	Mar. 31	8,584	8,845	+ 261	13	117,832	+ 8,042
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	Apr. 1	1,699	1,571	— 128	1	1,571	— 128
Burton-on-Trent Corp...	,, 2	265	227	— 38	1	227	— 38
Bury Corporation	Mar. 26	1,194	1,212	+ 18	51⅔	68,801	+ 402
Cardiff Corporation	,, 25	1,554	2,614	+ 1,060	51	138,838	+ 1,370
Chatham & District	,, 30	1,037	1,031	— 6	13	13,318	+ 727
Chesterfield Corp.	,, 23	248	257	+ 9	51	13,711	+ 179
Colne Corporation	Apr. 1	262	294	+ 32	...	...	...
Cork Electric	Mar. 30	429	433	+ 4	13	5,730	+ 77
Croydon Corporation ...	,, 24	1,678	1,628	— 47	51	91,800	+ 5,097
Derby Corporation	Apr. 1	967	1,035	+ 68	52	54,604	+ 2,945
Dover Corporation	Mar. 31	172	210	+ 38	52	15,695	+ 2,433
Dublin & Lucan	,, 31	154	113	— 41	13	1,466	— 89
Dublin United	,, 31	5,652	5,856	+ 204	13	75,345	+ 4,297
Dundee City	,, 29	1,212	1,240	+ 28	45⅔	61,613	+ 3,613
East Ham Corporation	Apr. 1	1,279	1,168	— 111	52	68,047	+ 5,415
Exeter Corporation	Mar. 31	304	319	— 15	52	19,123	+ 1,159
Glasgow Corporation	Apr. 1	20,438	21,610	+ 1,172	44	952,622	+ 70,773
Glasgow Subway	,, 1	1,053	1,219	+ 166	13	16,289	+ 2,001
Glossop (U. Elec. Supp.)	,, 1	120	128	+ 8	14	1,785	+ 275
Halifax Corporation	Mar. 28	1,908	1,854	— 54	51⅔	112,123	+ 650
Do. Motor Omnibuses	,, 28	38	35	— 3	51⅔	2,415	— 76
Hastings & District	,, 31	746	705	— 41	13	9,288	— 34
Huddersfield Corp.	Apr. 1	2,334	2,646	+ 312	52	139,379	+ 18,277
Hull Corporation	,, 1	3,033	2,949	— 84	52	161,945	+ 185
Ilford U.D.C.	Mar. 25	563	612	+ 49	51	33,007	+ 3,525
Ilkeston Corporation ...	Apr. 6	137	125	— 12	1	125	— 12
Ipswich Corporation	,, 1	424	478	+ 54	52	27,910	+ 5,096
Isle of Thanet	,, 1	323	244	— 79	26	6,525	— 1,086
Kilmarnock Corp.	,, 1	155	156	+ 1	46	7,640	+ 317
Lanarkshire	Mar. 30	1,706	1,892	+ 186	13	27,225	+ 4,608
Lancashire United	,, 29	1,440	1,535	+ 95	13	20,247	+ 1,024
Leeds City	Apr. 1	8,023	8,796	+ 773	1	8,796	+ 773
Leicester Corporation ...	,, 1	2,888	3,172	+ 284	13	41,806	+ 5,322
Leith Corporation	,, 1	661	764	+ 103	46	35,222	+ 3,087
Leyton U.D.C.	Mar. 30	1,497	1,432	— 65	52	82,396	+ 8,546
Liverpool Corporation...	Apr. 1	72,171	73,021	+ 850	13½	172,473	+ 8,552
Llandudno & Colwyn B.	Mar. 31	290	196	— 94	17½	3,253	— 54
London County Council	,, 22	47,162	44,722	— 2,440	51	2,255,635	— 24,989
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	Apr. 1	167	115	— 52	25½	3,314	— 997
Maidstone Corporation..	Mar. 30	131	166	+ 35	52	10,926	+ 532
Manchester Corp.	Apr. 1	16,182	17,472	+ 1,290	52	931,942	+ 36,001
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	Mar. 30	69	164	+ 95	52	10,151	+ 852
N'castle-on-Tyne Corp.	Apr. 1	5,888	5,946	+ 58	52	321,493	+ 30,314
Newport (Mon.) Corp.	,, 1	639	836	+ 197	52	44,382	+ 2,753
New St. Helens & Dist.	Mar. 29	874	814	— 60	39	38,788	+ 3,306
Northampton Corp.	,, 31	487	527	+ 40	52	37,298	+ 5,651
Nottingham Corp.	,, 31	3,047	4,426	+ 1,379	52	194,627	+ 18,326
Oldham Corporation ...	Apr. 2	2,157	2,416	+ 259	1⅔	3,149	— 217
Portsmouth Corp.	,, 1	2,183	2,232	+ 49	52	126,491	...
Preston Corporation	Mar. 22	848	949	+ 101	51	49,869	+ 3,278
Provincial	Apr. 1	2,039	2,112	+ 73	26½	53,267	+ 3,355
Reading Corporation	Mar. 30	676	752	+ 76	52	40,913	+ 4,408
Rhondda Tramways	,, 23	1,201	1,196	— 5	12	13,818	+ 1,021
Rochdale Corporation...	Apr. 1	1,686	1,600	— 86	50½	87,834	+ 4,138
Rotherham Corp.	,, 5	1,018	1,031	+ 13	⅔	1,031	+ 13
Salford Corporation	,, 31	2,383	2,923	+ 540	½	2,923	+ 540
Sheffield Corporation....	Apr. 2	8,117	9,936	+ 1,819	1½	10,869	+ 1,931
Southampton Corp.	Mar. 29	1,176	1,443	+ 267	52	77,629	+ 9,587
Southend-on-Sea Corp...	,, 29	643	599	— 44	52	40,150	— 8,430
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 25	708	713	+ 5	51⅔	40,370	+ 2,035
Sunderland Corp.	,, 26	1,302	1,455	+ 153	52	77,761	+ 3,099
Sunderland District...	,, 29	535	597	+ 62	22	12,325	+ 971
Swindon Corporation ...	,, 29	161	177	+ 16	52	10,118	+ 909
Torquay Tramways	,, 31	421	411	— 10	13	5,250	— 94
Tyneside Trys. & Tmrds.	,, 29	514	507	— 7	13	6,281	— 199
Wallasey Corporation ...	Apr. 1	1,057	1,129	+ 72	52	65,436	+ 1,758
Walsall Corporation	,, 3	656	742	+ 86	14	10,167	+ 2,364
Walthamstow U.D.C....	Mar. 31	642	622	+ 20	52	45,510	+ 4,165
Warrington Corp.	,, 23	426	462	+ 36	51	23,882	+ 1,728
West Ham Corporation	,, 30	2,925	2,919	— 6	52	160,076	+ 12,459
Wigan Corporation	,, 30	1,438	1,509	+ 71	52	7,199	+ 3,929
Wolverhampton Corp....	Apr. 5	1,293	1,180	— 113	1	1,180	— 113
Yorkshire (W. Riding)...	,, 2	1,508	1,755	+ 247	14	22,172	+ 2,258

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

Tramway Track Construction
AND
Maintenance
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 19. LONDON, SATURDAY, APRIL 15, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)- In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Wednesday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Monday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF WIGAN.

The Electricity Committee of the Wigan Corporation invite tenders for the following:—

1. Supply, Laying and Jointing of High Tension, 3-core Paper and Lead Covered Armoured Feeder Cable.
2. Transformer and Switchgear.

Copies of Specification, with Form of Tender, etc., may be obtained on application to Mr. James Slevin, Borough Electrical Engineer, Bradford Place, Wigan, on payment of £1 1s. for each specification, which sum will be returned on receipt of a bonâ fide tender.

Plans can be seen at the Borough Electrical Engineer's Office.

Sealed Tenders, endorsed "Cable" or "Switchgear" (as the case may be), to be delivered to me on or before Wednesday, the 26th instant.

The Committee do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Town Clerk's Office, Wigan.
April 12, 1916.

COUNTY BOROUGH OF WEST HARTLEPOOL.

ELECTRICITY DEPARTMENT.

WATER TUBE BOILERS, ETC.

Tenders are invited for the supply and erection complete of two Water Tube Boilers equipped with Superheaters and Mechanical Stokers.

Conditions of Contract, Specifications, and Form of Tender may be obtained from the undersigned on payment of a deposit of one guinea, which will be returned on receipt of a bonâ fide tender. Sealed tenders, addressed to the Town Clerk, West Hartlepool, and endorsed "Tender for Water Tube Boilers," to be delivered on or before April 28, 1916.

The Corporation does not bind itself to accept the lowest or any tender.

J. W. SPARK,
Borough Electrical Engineer.

Corporation Electricity Department, West Hartlepool.
April 11, 1916.

THE URBAN DISTRICT COUNCIL OF ABERDARE.

LUBRICATING OILS.

The above Council invite tenders for the supply and delivery of Lubricating and other Oils to March 31, 1917.

Tender Forms and Specifications may be obtained on application to the undersigned.

Tenders, endorsed "Tender for Lubricating Oils," and addressed to W. R. Morgan, Esq., Clerk to the Council, Town Hall, Aberdare, Glam., must be received on or before Wednesday, April 19, 1916.

The Council do not bind themselves to accept the lowest or any tender.

A. J. ABRAHAM, M.I.E.E.
General Manager.

Electricity and Tramways Department,
Aberdare, Glam.
April 11, 1916.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

The Directors are prepared to receive tenders for Twelve Steel Carriage Underframes, 58 ft. long.

Copies of the specification, drawings, and form of tender may be obtained on application to the Secretary at Amiens Street Terminus, Dublin, on payment of a fee of ten shillings, which will be refunded on receipt of a bonâ fide tender and the return of the drawings.

Tenders, under cover, marked "Tender for Underframes," should be delivered to the undersigned not later than 10 a.m. on Monday, April 24, 1916.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
April 4, 1916.

POSITIONS VACANT.

THE URBAN DISTRICT COUNCIL OF ABERDARE.

ELECTRICITY AND TRAMWAYS DEPARTMENT.

The above Council invite applications for the post of temporary Chief Clerk in their Electricity and Tramways Department. Applicants should have had experience with the forms of accounts prescribed by the Board of Trade and Municipal Tramways Association, and have a good knowledge of central station book-keeping and statistics in all branches, and be able to supervise office staff.

Candidates must be ineligible for military service.

Salary at the rate of £140 per annum.

Applications, giving age, date upon which applicant can commence duties, and experience, with copies of three recent testimonials, must be delivered to the undersigned, endorsed "Temporary Chief Clerk," not later than Wednesday, April 19, 1916.

W. R. MORGAN,
Clerk to the Council.

Town Hall, Aberdare, Glam.
April 11, 1916.

CITY OF BIRMINGHAM.

ELECTRIC SUPPLY DEPARTMENT.

APPOINTMENT OF JUNIOR SHIFT ENGINEER.

Applications are invited for the position of Junior Shift Engineer, required at the new Temporary Station, Nechells. The appointment will be permanent.

Applicants must have had a sound mechanical and electrical engineering training, and must have had previous experience in a large extra-high-tension three-phase power house.

The commencing salary will be £104 per annum, rising at the discretion of the Committee to a maximum of £200 per annum.

Applications (made on forms which can be obtained from the Secretary of the Electric Supply Department), accompanied by not more than three testimonials as to experience, ability, and character, must reach the undersigned not later than April 24, 1916.

R. A. CHATTOCK,
City Electrical Engineer and Manager.

Electric Supply Offices,
14, Dale End, Birmingham.
April 10, 1916.

TRAFFIC INSPECTOR.

Smart Traffic Inspector wanted. Must be used to controlling traffic and arranging running, also ineligible for Military Service. State age, whether married, past experience and enclose copy references, with photo, to Maidstone and District Motor Services, Ltd., Maidstone.

TRAMWAY TICKET CLERK.

Fully experienced Tramway Ticket Clerk required. Must be over military age or otherwise ineligible for Military Service. Give full particulars, age, experience and salary required.—Box 12, "Tramway and Railway World," Amberley House, Norfolk Street, Strand, London, W.C.

Digitized by Google

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 3488 Leeds. MATERIAL AND SUPPLIES.

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.
Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.
Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum. including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, APRIL 15, 1916.

THE FINANCIAL OUTLOOK.

That there is some delay in issuing even approximate results of the working of tramway undertakings for the past financial year is not surprising, for the conditions have been unprecedented. It is known that numerous undertakings will show largely increased receipts owing to the activity on war work; but it remains to be seen whether the money so received is counterbalanced by the augmented expenditure entailed by allowances to those dependent upon the men serving with the Forces and by the higher cost of power and materials. As a rule the lack of materials has prevented anything but inevitable maintenance work on the permanent way, though that fact ought not to prevent the authorities setting apart sufficient funds to meet the cost of renewals when times become normal. As the past year is the first complete twelve months under war conditions, the dependents' allowances and the deferred cost of renewals will be far greater than in the preceding financial year. The extent of the increase in allowances to dependents is shown by the statement that in the case of the London County Council Tramways the total has risen from £40,000 to £120,000. Elsewhere the increase due to this cause will be correspondingly large, and no surprise will be occasioned if a demand arises for placing the burden on the rates. There is a likelihood that some undertakings will reveal financial results that will fully justify the example set by Birmingham and Leicester in raising fares last year; for these places do not stand alone in having previously given too liberal a reduction in fares before the outbreak of war. Already the announcement has been made that the Newcastle Tramways Committee are finding their receipts so closely approached by the expenditure that they are considering the question of revising halfpenny and other fares, while Lancaster Council have sanctioned an all-round increase. Dundee and other places are withdrawing the free rides to unwounded soldiers, and others are troubled with applications for increased bonuses. Certain workmen at Hull have been granted an additional 2s. a week, and in resisting a proposal for 3s. the Chairman of the Tramways Committee warned a meeting of representatives of spending committees that the extra shilling would involve the raising of fares. Applications for passes to be issued to war hospital nurses have been followed by requests for similar favours to permanent nursing associations, which have rightly been refused. By the former class the concession will not be required after the war, a statement that we fear will not be applicable to employees' bonuses. That aspect of the matter must not be forgotten in estimates of future working. To permit any postponement of allocations on account of bonuses and renewals will lead to greater difficulties. This is shown in the case of West Ham, where the unwise policy of relieving the rates, prior to the advent of omnibus competition, has left the Tramways Committee with no money in hand towards the sum of £100,000 required for renewals. So far the Council have come to no decision on the schemes submitted by the manager for improving the finances. In a proposal that he recommends most strongly, Mr. Moffet advises the abolition of the unprofitable halfpenny fare and the institution of a universal penny charge, adding that he is convinced that the neighbouring authorities would eventually follow suit. This recommendation was made more than two months since, and the manager at Leyton is now, very wisely, we think, advising the adoption of a similar course. Although West Ham Council are pursuing the dangerous policy of indecision, it is satisfactory to observe that a determined effort was made upon the introduction of the estimates two weeks ago to restore the equilibrium as regards the renewal fund. A motion to levy a twopenny rate to meet the estimated deficiency on the working this year, was lost by 23 votes to 20, while failure was also the fate of a proposal to transfer to the tramways account the sum of £35,784, representing the total amount hitherto appropriated for the relief of rates. Taking the tramway situation as a whole, it may be said that everywhere the need for caution is enforced by the experience of the past year. Future conditions are still obscure. The tramway industry, like many others, may have to undergo such tests as will severely try, and even strain, all but the strongest of the undertakings. Few tramways, either municipal or private, have a reserve fund sufficient to tide over any serious emergency; resources have been dissipated too generously in low fares and doles to the rates. The time has come for a change of policy if stability is to be maintained.

GATESHEAD ACCIDENT PRECAUTIONS.

The Railway Department of the Board of Trade have informed Gateshead Council that Colonel von Donop, R.E., in his report with reference to a car running back on Bensham Bank, has informed the company that a slight change in the position of Ravensworth loop would provide a better gradient for cars to stand on, and, further, recommended that a rule be issued providing that motormen should not leave their cars during the journey. The Tramways Company have written the Council to the effect that they were prepared to carry out the suggestions in regard to the lengthening of the Ravensworth loop. The directors were in favour of a double line for the full distance, and they submitted that as part of a scheme. They were also in favour of double lines on all gradients. If the Council approved of the scheme, the work at the Ravensworth loop would be carried out in three months. Strict instructions had been given to motormen not to leave their cars, except in special circumstances, and to apply hand and track brakes when stopped on a gradient. If those instructions were carried out, it would be impossible for an accident like that on Bensham Bank to occur.

Digitized by Google

SOUTH METROPOLITAN AND CROYDON STRIKE.

On the plea that the South Metropolitan Tramways Company were about to introduce women as drivers, the employees of that company left their work on Friday last. According to the president of the London and Provincial Vehicle Workers' Union, the chief reason of the strike was the refusal of the company to submit the men's grievances as to pay and conditions of labour to arbitration. It was stated, however, by Mr. A. V. Mason, the general manager, that concessions were made last April, and were agreed to by the representatives of the men. Two women were taken out on the cars on Thursday, April 6, for preliminary instruction in driving, at the request of the Board of Trade, in order that a report might be made on their fitness, or otherwise, for the occupation of driving, in view of the shortage of men. It would have been wiser, however, in our opinion, if the Board had obtained that information from the Glasgow tramways manager, whose department has been training women as drivers for six months past.

On Tuesday the strike spread to a minority of the Croydon Corporation employees, notwithstanding that the company had expressed their readiness to submit the case to arbitration if the union would order the men to return. The men's representatives decided to hold out until Croydon Corporation would agree to arbitrate. The Croydon authority refused to comply with the demand, and it will be remembered that a few weeks ago the Corporation supported the Tramways Committee in their refusal of an invitation from Sir Geo. Askwith, the Chief Industrial Commissioner, to arbitrate on demands then made by a section of the men. Mr. T. B. Goodyear, the general manager, emphasised this point in an interview on Wednesday. "There are," he said, "many points in dispute raised by the union, but the chief demand is that tramway employees should receive the same rate of pay in the suburbs as in London proper. To concede the men's demands would entail an additional annual expenditure of £10,000, equivalent to 2½d. extra rate on the borough. A concession to the tramway men would inevitably lead to demands from the other men also, and soon an additional levy of a shilling at least might have to be added to the rates. Obviously this is out of the question, especially during the war period."

During the week a fair service was maintained on the company's Croydon and Sutton route, and turns at driving were taken by Mr. Mason, Mr. Manley, chief engineer, and Mr. Hughes, traffic superintendent. Inspectors, clerks, and a few loyal motormen were at work. The majority of the women conductors joined the strikers. Mrs. Mason, wife of the general manager, undertook the work of a conductor. On Monday a notice was posted in the depôts stating that the manager had refused to consider the questions in dispute until the men resumed duty. It added that unless the men returned by the following day the cases of about thirty motormen for whom exemption was being claimed at the tribunals would not be proceeded with.

On the Croydon undertaking only eighteen cars were running on Tuesday, in place of the customary fifty-eight, but the number has since been increased. Here there were more women ready to conduct cars than there were drivers available. During the day the Board of Trade intervened, and there was a meeting at the Board of representatives of the London and Provincial Union of Licensed Vehicle Workers, and the representatives of the South Metropolitan Tramways Company, the London United Electric Tramways, and the Croydon Corporation Tramways. There was a discussion on the question of referring the points at issue to arbitration, but though the other parties agreed, Croydon Corporation refused.

It is alleged by the men that the conditions of service in Croydon are worse than in any other part of the London area. According to their union spokesman, the work is spread over 17 hours 20 minutes a day, against an average of 14½ hours in London, while wages are on an average 6*s*. a week less than those paid by London County Council. On the other hand, an official of the Corporation stated that the spread-over time never exceeds 15 hours, and is rarely so long. Motormen are paid from 6½*d*. to 7*d*. an hour, and conductors from 6*d*. to 7*d*.

A notice was issued to Corporation employees warning them that any man who failed to report for duty on Thursday would be considered as having left the service.

After making rash speeches to the strikers during the first part of the week, their organisers adopted a subdued tone on Wednesday by informing the South Metropolitan men of the result of a conference with Sir George Askwith, and recommended them to return to work. This they refused to do until the Corporation men secured a promise of arbitration. The union have taken advantage of the situation to press claims made by the London United employees, and they say that both the companies have agreed to arbitration. At a meeting on Monday one of the union officials referred to the committee formed at the instance of the Home Secretary to inquire whether licences to drive cabs, omnibuses and tramway cars should be granted to men who had been partially disabled in the war. He had, he said, given evidence to the Committee that it would not be in the interest of public safety that men who were disabled or who had lost a limb should be employed on the cars, especially in view of the fact that before the war a strict examination had to be passed before a man could be passed for driving.

As a specimen of false information the following remark credited to the same speaker is worthy of mention: "Women had been employed to drive tramcars at Glasgow, Leeds, Bradford, and Cardiff, but their efficiency in those places might be judged by the large number of accidents there had been. Then it could not be claimed that the traffic conditions in those cities in any way approached that in London; they were in no way comparable." Evidently the speaker is not only ignorant as to where women drivers are employed, but he has apparently not been outside of London. In the places he names there are women drivers only at Glasgow and Cardiff, and in no case has an accident happened. The great argument of the union speakers has been that they can automatically order out the employees of the London United and Metropolitan Tramways, and that another "huge possibility" in the position is that when the agreement with the London General Omnibus Company terminates at the end of the month thousands of vehicle workers may be standing idle. One agitator has declared that if the men decide to strike the union officials are prepared to carry the dispute to the bitter end, even if they are deported.

The more reasonable policy of advising the men to resume work was persevered in by the union officials on Thursday, but without success, the strikers still affirming that they would not return until the Corporation Committee agreed to arbitration. Yesterday the announcement was made that the matter would be left to the decision of the Corporation at their ordinary meeting on Monday next. The impossibility of the Council granting the demands of their employees is shown by the statement that for the year just concluded the tramways undertaking shows a net profit of only £200. The expenditure includes the sum of £5,000 paid to the dependents of enlisted men.

EDINBURGH TRAMWAY DIFFICULTIES.

At a meeting of Edinburgh Town Council on April 5, the burgh engineer, Mr. A. H. Campbell, reported that during the past month there has been 107 stoppages of the tramways. As is well known, the cable system is in use, and latterly the regular running of the cars has been very seriously interfered with, owing to causes that appear to be in dispute. The tramways are owned by the Corporation, but are leased to the Edinburgh and District Tramways, the lease expiring in June, 1919. The question of future arrangements has been receiving the attention of the Town Council, who retained Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways, to report on the subject. In the course of his report, which will, no doubt, be published in due course, Mr. Hamilton remarks that in view of the purchase of new cars being open to the Corporation, and the life of the cable system being probably limited, his opinion is that they would be justified in paying to the company at the end of the lease £25,000 for the 209 cars and the spare equipment. The directors of the Tramway Company would not accept less than £75,000, and the Committee regarded that as putting an end to their negotiations.

With regard to the present position, the report states that on March 2 an order, signed by the Corporation's engineer, was served on the Tramway Company and Dick, Kerr & Co., Ltd.—the latter being parties to the lease—requiring them to carry out necessary renewal and repair work within certain specified dates. The Committee intend to follow up these orders, with others, until all the company's obligations have been fulfilled. There are about forty-eight miles of cable tramway (twenty-four street miles) and one mile of electric line. The former are laid with girder rails weighing eighty-three lbs. per yard, the latter with one-hundred-lb. rails. The power stations from which the cable lines are worked are equipped with eleven horizontal non-condensing compound engines with a total capacity of 7,590 horse-power. The track and power stations are the property of the Corporation, but the cars are owned by the company. Mr. J. D. R. Cox is the general manager, Mr. C. W. Shepherd, secretary, and Mr. E. Lafferty, traffic manager. The following are directors of the company: Mr. B. Hall Blyth (chairman), Mr. A. H. Laidlay, Sir Robert Maule, Mr. J. M. Dick Peddie, and Mr. W. Rutherford.

MISCELLANEOUS NEWS AND NOTES.

Next Week's Issue.—Friday of next week being Good Friday, THE TRAMWAY AND RAILWAY WORLD will be printed on Wednesday, and all communications should be received not later than noon on that day.

Last Car Hour at Lowestoft.—From March 31 onwards the tramcars are running at Lowestoft until 8 p.m., instead of 7 o'clock.

Conductors and Car Illumination.—The Edinburgh Sheriff has held that the conductor of a tramcar is responsible for the duty of supervising the condition of the car as regards the proper obscuration of the lights.

Fares for Dogs.—In consequence of complaints of dogs being allowed on the cars, West Hartlepool Council have decided that they shall be permitted to ride on the top deck, and then only upon the owners paying the same fare as that of a passenger.

"Safety First."—At the instance of the York Tramways management, a summons was heard at the police court on April 3 against a man who wilfully attempted to enter a tramcar in motion. In dismissing the summons with a caution, the magistrate said the next case would be severely dealt with.

Penny Universal Fare.—Mr. L. E. Harvey, manager and engineer, Ilford Council Tramways, has advised the Tramways Committee to consider the question of instituting the penny universal fare. In view of the increased working expenses he suggests that the scheme should be adopted for the duration of the war.

A Petty Fine.—For wilfully impeding a Croydon Corporation tramcar for a mile and a furlong, thereby delaying the car for six minutes and disorganising the service, the driver of a lorry has been fined 20*s*. and 10*s*. towards the costs. The magistrates characterised the offence as a bad one.

Digitized by Google

Bristol Tramways Option Committee. By 39 votes to 31 the Bristol Council on April 11 refused to rescind the motion adopted at the previous meeting, for deferring consideration of the expenditure by the Tramways Option Committee until after the Corporation have decided whether or not they will purchase the tramways undertaking.

Through Running Agreements at Blackpool.—The Corporation Tramways Committee have, with the consent of the Council, decided that the privilege of running cars on the Corporation's tramways should be granted to the Blackpool and Fleetwood Tramroad Company and the Blackpool, St. Annes and Lytham Tramways Company on the terms of a through running agreement in each case.

Oldham Cars for Rotherham.—The Tramways Committee of Rotherham have decided to exercise the option to purchase an additional eleven bogie tramcars from Oldham Corporation at a price not exceeding the sum paid for the car purchased in January last, subject to the cars being in a condition satisfactory to the tramways manager and to the consent of the Board of Trade being obtained to the running of such cars at Rotherham.

Tramcar Collections.—Instituted ten weeks ago, the tramcar collections at Birkenhead have become a feature of the war work of the town. With the support of the Tramway Committee, Mr. C. Clarke, the general manager of the Tramways Department, has taken up the task of supervising the work. The amount raised during nine weeks has been £353, and the weekly ingathering has never been less than £30. At the top of the list comes the Prisoners in Germany appeal, which produced over £54.

Double-deck Cars for Colwyn Bay.—It is understood that Colonel Druitt has reported to the Board of Trade in favour of double-deck cars being allowed to run on the Old Colwyn and Penrhyn Bay section of the Llandudno and Colwyn Bay Electric Railway Company, but he recommended that certain parts of the track should first be repacked. Colonel Druitt found the line for the most part very well laid and equipped, and recognised the difficulties of the Company in obtaining the necessary labour for maintenance during the war.

Employees' Request for Black Buttons.—Bolton Tramways Committee have declined to grant a request from the men's union that the next lot of motormen's and conductors' overcoats should be fitted with collars and black buttons. It is the exception now to find a car hand's tunic made minus a fold-down collar. Non-metal buttons, for lack of material, have been used in the new armies. In the hands of the average tramwayman who has not had a military training button cleaning is either often neglected or leads to the spoiling of the cloth.

Hours of Women Omnibus Conductors.—Mr. Cathcart Wason asked the Home Secretary in the House of Commons on April 11 how many hours a day girls and young men were employed as conductors on motor-omnibuses, at what time their duties commenced in the morning, what times were allowed for meals, and when their duties for the day were ended. Mr. H. Samuel: "I am informed that, generally speaking, the hours for women and men are practically identical, and vary from nine to twelve hours per day. The earliest shifts begin work at 6 a.m. and the latest finish at midnight. The times off daily also vary from about forty minutes to four hours. I understand that the majority of the women do not work more than four or five days a week."

Electric Tramway Material.—Tenders will be opened at noon on May 30 at the "Dirección General de Obras Públicas, Ministerio de Fomento," Madrid, for the construction and working, for a period of 60 years, of an electric tramway in Melilla. The minimum rolling-stock required is 16 closed coaches, with motors and accessories. Construction work must be commenced within three months and completed within two years from the date of the award of the concession. An option on the concession is held by Don Felipe Ezquerro. The Commercial Intelligence Branch of the Board of Trade states that, although this contract will probably be awarded to a Spanish firm, nevertheless the carrying out of the works may involve the purchase of some material outside Spain.

Bloemfontein Railless Traction.—Following the successful working of the railless trolley car service at Boksburg, a similar undertaking was installed at Bloemfontein. It was opened for service in January. The passenger colour problem has arisen in connection with the improved type of car in use. A seat for four persons on the conductor's platform was intended for the use of natives, but the seats have been monopolised by Europeans. In consequence of complaints from the natives, the management directed the conductors to ask white passengers to go inside in the event of natives boarding the car. Replying to questions put to him at a meeting of the Town Council, the City Engineer said he did not see any occasion to alter the construction of the cars or to solve the difficulty by introducing trailers.

Cost of Plymouth Arbitration.—The costs incurred by the Corporation in connection with the Devonport and District Tramways arbitration totalled £7,736, the several items being: Witnesses, £2,879; counsel, £1,350; agents, £205; committee's expenses, £118; officers' expenses, £30; printing, £235; miscellaneous expenses, £190; arbitrator's fee, shorthand note and printing of proceedings, hire of room, etc. (one-half payable by Corporation), viz., £1,415; stamp duty on transfer, £1,040. Upon the statement being presented to the Town Council on Monday, April 10, Councillor Bond stated that the Tramways Company asked £260,000 for the undertaking, and as the result of the arbitration the Council had to pay only £111,000, while their costs were £7,735. The Town Clerk said the payments to witnesses were a matter of agreement and not taxation.

National Guard Mechanical Transport.—Several convoys of lorries, which have been placed at the disposal of the National Guard Mechanical Transport Column by a number of makers and owners, will participate in the Easter work of the Guard at Brighton. Between thirty and forty lorries (the majority of which are of the approved War Office type) will leave London on April 20, returning from Brighton on Easter Monday. Owners of lorries who are willing to assist with the loan of vehicles are invited to communicate with the column commander or Adjutant Bristow, care of the Commercial Motor Users' Association, 83, Pall Mall, S.W. The Column has done much useful work in the transport of troops and stores in connection with trench digging and field exercises, in the conveyance of wounded soldiers, doctors and ambulance men, and in drawing up a special drill for the transport of infantry, which has been approved of by the War Office.

Evasion of Fares.—To facilitate the detection of persons who adopt various methods of evading the payment of the proper fare, extra conductors are being employed on the London County Council cars during the rush periods. The urgency for the employment of women conductors is shown by the fact that they are now to be seen on the cars before receiving their uniforms. It would facilitate the carrying out of their work if they each possessed a copy of the quarterly guide and map. A few days ago a woman conductor was asked the route number of a car into which a passenger had to change at a transfer point. She was unable to give the information, but made inquiries on the point among the other passengers—Notices have been posted in the Nottingham Corporation cars warning passengers of the rule in the Tramways Act, which declares that for non-payment of fare or for travelling beyond the stage to which a ticket has been issued a passenger becomes liable, on conviction, to a penalty of £2.

PERSONAL.

Mr. T. Law, of Rotherham Corporation Tramways staff, has been presented with a clock by the employees at the depôt, on the occasion of his marriage with Miss H. Moon.

Mr. R. L. Horsfield, general manager, Walsall Corporation Tramways, has had his salary increased by £100 per annum. Alderman J. Cope, chairman of the Tramways Committee, informed the Council that no application was received from Mr. Horsfield; the proposal was solely that of the Committee.

Mr. C. J. Spencer, general manager, Bradford Corporation Tramways, has been appointed vice-chairman of the Lord Mayor's Citizens' Contribution Committee, of which Mr. T. Roles, the city electrical engineer, is also a member. The work of the Committee is to impart system to the collection of funds for the replenishment of the Lord Mayor's War Relief Fund.

Belfast Managership.—The City Council on April 10 decided that the salary to be attached to the office of tramways manager should be £700 per annum, rising by annual increments of £50 to £1,000 per annum. A writer in the "Northern Whig" states that before the advertisements for the new manager are in print "the appointment will have been virtually settled. Indeed, unless common report is a common liar, it is practically settled already, provided nothing happens to 'upset the pot.'"

Rotherham Council have increased the salaries of the traffic superintendent (Mr. H. Jagger) and the chief traffic clerk, Mr. C. Webster, from £150 to £162 10s. per annum, with further advance to £175 on March 25, 1917.

The Late Captain J. H. Courtis, Oxford and Bucks Light Infantry, son of Sir John Courtis, chairman of Cardiff Tramways Committee, is mentioned in the despatch forwarded to the War Office by General Sir John Nixon, relative to the operations in Mesopotamia, from April to September, 1915.

CONTRACTS AND ORDERS.

Siemens Brothers and Co., Ltd., have received an order for the supply of two and a half miles of service cable from Leyton Urban Council.

Edgar Allen and Co., Ltd., have obtained a contract for the supply and supervising the fixing of points and crossings for Gloucester Corporation light railways.

Darlington Council have accepted the tender of Messrs Babcock and Wilcox, Ltd., for the supply and erection of coal-handling plant at the electricity works, and of B. Blackett and Sons for overhead coal bunkers.

Manchester Electricity Committee have accepted the tenders of M. Louis Prat, of Paris, for induced-draught plant, sub-contracts to be let to E. Danks and Co., Ltd., of Duxbury, for the chimney, Lancashire Dynamo and Motor Co., Ltd., for electrical materials, and Galli Bros. for the foundation base.

Manchester Tramways Committee have accepted the following tenders: C. Macintosh & Co., Ltd., Manchester, supplying rubber tubes, supplying and fixing rubber tires on motor tower-wagons, and motor-car tires (covers and tubes) during the next twelve months: Dunlop Rubber Company, Ltd., supplying and fixing solid rubber tires on motor omnibuses.

Brake Blocks.—In reply to remarks made at a meeting of Belfast Council in regard to tenders for brake blocks, Councillor M'Caughley, chairman of the Tramways Committee, said the tenders were dealt with in the usual way. The cross-Channel firm quoted £8 0s. for a twelve months' contract, and the local firm would only contract for six months at £9. Slipper blocks were quoted at 9s. and 12s. 6d., and the Belfast firm's figure was 10s. 2d. If the Corporation wanted the local firm to get the contract, he had no objection.

Digitized by Google

The Victorian Railways Department have placed the following contracts:—Stothert and Pitt, electric cranes for Ballarat and Bendigo workshops; British Westinghouse Co., frequency changers and rotary converters for Spencer Street and Elwood sub-stations; R. W. Cameron and Co., battery signal machines and Ackley brakes; McKenzie and Holland, electric point and lock detectors; Noyes Bros., toggle insulators for St. Kilda-Brighton electric railway; Gibson, Battle and Co., fifteen-ton electric crane, &c., £1,596; Forman and Co., railway and electric tramway crossing, £229, and steel anchor bolts for overhead equipment.

Delivery of Motors.—Mr. G. F. Craven, general manager, Reading Corporation Tramways, has reported that Messrs. Dick, Kerr & Co., Ltd., are prevented by the Minister of Munitions from delivering the six car motors that were ordered in November last. At the request of the representative of the Minister of Munitions, he had attended at Armament Buildings and pointed out that the motors were needed to reduce the repair work, that the cars were carrying munition workers, and that Government work was being done in the repair shop. The representative, however, had recommended the Minister to refuse a certificate to Messrs. Dick, Kerr & Co. on the ground that the motors were not needed for cars used exclusively for carrying munition workers. The controllers, which were ordered at the same time, had been delivered.

FINANCIAL REPORTS AND MEETINGS.

Sao Paulo Tramway, Light and Power Company.—A dividend of two and one half per cent. on the issued common stock has been declared.

Gearless Motor Omnibus Company.—A dividend of eight per cent. is announced for 1915, adding £1,000 to the reserve, and carrying forward £641. The company is associated with the London General Omnibus Company.

Rochdale Corporation Tramways.—The total receipts for the past year were £82,846, an increase of £4,477. The cars have run 1,600,678 miles, a decrease of 88,535 miles. 13,705,871 passengers were carried, an increase of 298,553 on the year. The receipts work out at nearly 12½*d.* per car mile, or more than a penny per mile in excess of the receipts of 1914-15.

Oldham Tramways Satisfactory Year.—For the year ended March 31, the net profit on the tramways was £3,985, and the gross profit over £10,000. Out of the latter the department had paid £5,225 in war allowances to employees' dependents, £1,000 for an extension of Hollinwood depôt, and £548 for a street improvement. On the three motor omnibuses there was a loss of £720.

Llanelly and District Lighting and Traction Company.—Mr. A. R. Holland, who presided at the annual meeting, stated that the results so far for the corresponding period of 1915 showed an increase by both tramway and power sections, and he was glad to say the outlook for the future was satisfactory. Resolutions were passed providing for dividends at the rate of six per cent. per annum on the cumulative preference shares and two per cent. per annum on the ordinary shares, carrying forward £673.

Brush Electrical Engineering Company.—The net profits for 1915, including £7,065 brought forward, were £24,365 after providing for debenture interest. It is recommended that £8,000 be appropriated for depreciation, and £2,044 in payment of the further four per cent. interest to which the holders of the six per cent. prior lien participating second debenture stock are entitled out of the first net profits available for dividend in any year, that £5,000 be placed to the reserve, and £9,321 carried forward.

Tramway Traffic Receipts.—For the first time in many weeks the majority of the tramways whose returns are enumerated in our weekly list show a decrease in receipts. This is explained, however, by the fact that the corresponding week last year included the traffic of Good Friday and Easter Sunday. There is actually no falling off in the ordinary volume of tramway traffic. In most of the towns substantial increases are still being recorded. As will be seen from our traffic summary, the increased earnings per mile of single track for the week ended April 1, averaged £3 14*s.* 6*d.*

London County Council Tramways.—For the year ended March 31 it is anticipated that the accounts will show a deficiency of £70,000, which will have to be met by drawing upon reserves. The general reserve fund stands at about £70,000, but owing to the depreciation in securities this figure may be reduced by £6,000, which will necessitate taking that sum from the renewals reserve. This fund amounts to about a quarter of a million. During the past year the department have provided £120,000 in respect of employees' war allowances, £450,000 for debt redemption, and £400,000 for interest.

DICK, KERR & Co.,

Limited,

ABCHURCH YARD, CANNON STREET,
LONDON, E.C.

ENGINEERS & CONTRACTORS.

Complete Equipment

TRAMWAYS & LIGHT RAILWAYS

at home and abroad.

Wallasey Corporation Tramways.—The following comparison of traffic results for the year ended March 31, 1916, with the figures for the previous year, has been issued by Mr. R. B. Greene, the general manager:—

	Year ended March 31 1916.	Year ended March 31 1915.	Increase.
Traffic Receipts	£65,833	£63,097	£2,136 or 3.33%
Miles run	1,231,461	1,284,939	53,478 or 4.16% (*Dec.*)
Passengers ..	14,306,621 (a)	13,555,876 (b)	750,745 or 5.53%
Receipts per car mile ..	12.830*d.*	11.897*d.*	.933*d.* or 7.84%
Average fare per passenger	1.154*d.*	1.152*d.*	.002*d.*
Population served	90,000	87,000	3,000 or 3.44%
Times population carried	158	155	3 or 1.93%
Average paid per head of population	14*s.* 9*d.*	14*s.* 7*d.*	

(a) Including 626,464 Military passengers (free of charge).
(b) „ 286,172 „ „ „

Aberdare Tramways and Railless Cars.—The report of the general manager, Mr. A. J. Abraham, for the year ended March 31, 1915, shows that the business of the electricity department has considerably increased, the number of units sold being 1,035,079 as compared with 673,775 in 1914. The increase was mainly in connection with the traction undertaking, which required 464,449 units as compared with 167,306. Mr. Abraham remarked that the price obtained per unit has been very much lower than that of any other public supply in the United Kingdom, having regard to the output. As the tramway department has not yet been working two full years, comparisons are not yet possible. The following traffic records cover the operations for 1915:—

Year ended March 1915	No. of Car Miles	No. of Passengers	Passengers per car mile	Revenue per car mile	Costs per car mile
Cars	285,200	2,474,309	8.68	11.89*d.*	6.12*d.*
Omnibuses	77,182	570,792	7.39	8.71*d.*	7.48*d.*

The tramways are 2.7 miles in length, and the gross profit was £6,780. Allowing for interest and loan repayment, there is a net surplus of £4,044, which is equal to 2.52 per cent. on the capital. The railless omnibus system, which is still being worked by the contractors, has a route length of 2.98 miles. The gross profit was £423, and after providing for interest, certain special expenditure and loan repayment, there was a deficit of £574. Up to January 1, 1916, thirty-eight employees, or forty per cent., had joined the Forces. The following is a summary of the revenue account of the railless system:—

	£	s.	d.	Per car mile d.
Receipts	2,829	16	5	8.799
Traffic:— EXPENDITURE.				
Superintendent's salary	65	18	3	.205
Drivers' and conductors' wages ..	982	14	2	3.056
Cleaning and oiling cars	177	7	8	.552
Fuel, light, power, etc. for depot ..	42	5	1	.131
Ticket clerk and inspectors' wages ..	79	6	6	.247
Tickets, punches, etc.	14	13	0	.045
Licenses	6	0	0	.018
Uniforms and badges..	32	9	1	.101
General:—				
Salaries, general manager and office staff	102	15	2	.320
Store expenses	13	11	6	.042
Rents, rates and taxes	130	8	11	.405
Printing, advertising, etc.	26	10	11	.083
Office heating, lighting, cleaning ..	7	15	7	.024
Insurance and compensation, fire and other insurances	84	5	5	.262
Sundries	3	9	9	.011
Law charges	20	6	0	.063
Repairs and Maintenance:—				
Electrical equipment of line ..	35	19	6	.112
Buildings	15	8	10	.048
Cars	127	0	0	.395
Miscellaneous	17	6	1	.053
Power	421	14	6	1.311
Total expenditure	£2,407	5	11	7.484

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended April 1, the latest period for which full returns are available, give total receipts of £231,278, or £15,480 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £97 18*s.* 4*d.* per mile of single track, and last year at the rate of £94 3*s.* 10*d.*, thus showing an increase for the week of £3 14*s.* 6*d.* per mile open.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. Apr. 13.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	68¾	67½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	7/6	68/1½
4%	4%	Do. 4% Deb. ...	100	91	74½	73½
4½%	4½%	Do. 4½% Deb. ...	100	98½	73	73
5%	5%	Do. 5% Deb. ...	100	96	78½	77½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92½	92¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10⅛	10 5/16
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97	97
$½	$1	Brazilian Trac. & Power Ord....	$100	66	53⅞	56
$1½	$1½	Do. 6% Cum. Pref.	$100	97	82½	91½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	88/9	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	37½	37½
5%	5%	Do. 5% Cum. Pref.	100	103	51½	51½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	62¾	61½xd
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	70½	70½
70/-	70/-*	Do. 7% Pref.	100	55½	44	44½
—	—	Do. 6% Pref. Ord.	100	17½	15¾	15¼
—	—	Do. Def. Ord.	100	11	9⅜	9½
5%	5%	Do. 5% Deb.	100	92	78¼	78¼xd
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70½	70½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	89	90
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6 11/16	6 11/16
1/3	1/3	City of B.A. Trams.	5	5½	91/10½	93/9
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11⅜	11⅜
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	6/-	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	8/3	8/7½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	55½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	80½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	78½	78
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48½	48½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/6	98/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	65	65
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78¾	78¾
$1¾	$1¾	Mexico Trams. Common ...	$100	70	23¾	22¾
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40½	40½
6%	6%	Do. 6% Mt. Bds.	100	76	34½	32½
4½%	4½%	Montreal St. 4½% Stg. Debs. ...	100	100	94¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/2*	1/2¾*	National Steam Car	1	13/32	12/1½	12/-
9¾d.*	9¾d.*	New General Traction	1	½	7/9	7/9
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-xd
6/-	5/-	Para Elec. Rlys. Ord.	5	4¼	55/-	55/-
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/6	11/3
8d.	10d.	Provincial Trams. Ord.... ...	1	¾	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87xd
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	90	90¾
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74½	73½xd
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	88½
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	78½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾xd	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78½xd	76½xd
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	1915-16	Aggregate. Wks.	1915-16	Increase or Dec.
Anglo-Argentine	Apr. 8	£47,569	£52,399	15	£712,309	+ £2,971
Auckland.....(28 days)	Mar. 10	19,907	20,711	36	189,937	+ 3,002
Ballarat and Bendigo ...	Jan. 30	3,388	3,399	44	36,331	— 2,761
Brazilian Traction Mlrs.	Feb.	5,797,500	6,079,000	9	12,509,000	+ 715,310
Brisbane	Mar.	30,740	34,275	13	96,875	+ 9,925
British Columbia.....$	Feb.	558,512	572,935	35	4,405,030	— 792,876
Buenos Aires Lacroze ...	Mar.	44,332	42,219	39	372,882	— 6,594
Burmah Tramway ... Rs.	Apr. 8	3,678	3,905	36	...	+ 7,406
Calcutta.....Rs.	,, 8	59,514	67,169	15	955,417	+ 5,992
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	Mar.	2,436	2,991	13	7,417	+ 2,255
Cordoba	Feb.	11,534	11,831	48	148,308	+ 5,399
East India	Mar.	1,846	2,196	35	16,590	+ 1,214
Hong Kong .....$	Mar. 4	10,840	11,087	13	127,252	+ 14,897
Kalgoorlie	Jan.	2,372	2,236	5	2,236	— 436
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Mar.	34,185	34,159	13	101,073	+ 3,681
Lisbon .....Escu.	Jan.	...	183,882	...	...	...
Madras (2 weeks).....Rs.	Mar. 31	32,858	33,302	13	188,291	+ 19,204
Manila .....$	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Jan.	62,729	69,879	5	69,879	+ 7,150
Mexico .....$	*	...	...	...	...	...
Montevideo	Mar.	29,716	31,956	21	158,422	+ 10,553
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai .....$	Mar. 8	24,052	28,836	...	...	...
Singapore .....$	Mar. 4	11,384	11,952	9	109,457	+ 14,426
Toronto.....$	Feb.	767,326	846,256	9	1,752,606	+ 141,929
Winnipeg	Feb.	314,658	293,250	9	590,810	— 74,530

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Aggregate. Wks.	1916	Incr. or Dec.
Aberdare	Mar. 31	£319	£327	+ £8	52	£18,587	+ £1,702
Aberdeen Corporation...	Apr. 5	1,626	1,756	+ 130	44	78,528	+ 4,969
Accrington Corp.	Feb. 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	Apr. 8	343	274	— 68	48	16,619	+ 1,037
Bath Electric	*	..	...	...	...	...	...
Birkenhead Corp.	,, 9	1,362	1,418	+ 56	1½	1,859	— 217
Birmingham Corp.	,, 8	13,995	16,178	— 2,182	1¼	19,345	— 347
Do. Motor Omnibuses	,, 8	863	842	— 21	1½	1,003	— 186
Blackburn Corp.	,, 5	1,632	1,227	— 405	1½	1,755	— 467
Blackpool & Fleetwood.	,, 8	802	333	— 469	14	4,393	— 551
Blackpool Corp.	,, 6	1,724	1,216	— 508	1	1,216	— 508
Bolton Corporation	,, 9	2,775	2,725	— 50	2	3,784	— 815
Bournemouth Corp.	,, 12	2,163	2,057	— 106	2	3,651	— 1,148
Bradford Corporation ...	,, 8	7,521	6,400	— 1,121	2	8,002	— 2,443
Brighton Corporation ...	,, 9	1,060	974	— 86	1⅔	1,296	— 406
Bristol	,, 1	10,520	9,671	— 849	14	127,504	+ 7,193
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 8	1,733	1,665	— 68	2	3,236	— 196
Burton-on-Trent Corp...	,, 9	299	228	— 71	⅔	291	— 101
Bury Corporation	,, 9	1,447	1,308	— 139	1⅔	1,895	— 533
Cardiff Corporation	Mar. 25	1,554	2,614	+ 1,060	51	138,838	+ 1,370
Chatham & District	Apr. 6	1,329	1,114	— 215	14	14,431	+ 512
Chesterfield Corp.	Mar. 31	206	281	+ 75	52	13,992	+ 155
Colne Corporation	Apr. 8	272	270	— 2	...	...	...
Cork Electric	,, 6	513	468	— 45	14	6,198	+ 32
Croydon Corporation ...	Mar. 24	1,678	1,628	— 47	51	91,800	+ 5,097
Derby Corporation	Apr. 8	1,158	1,071	— 87	1½	1,302	— 406
Dover Corporation	,, 8	299	280	— 19	1½	330	— 127
Dublin & Lucan	,, 7	200	129	— 71	14	1,595	— 161
Dublin United	,, 7	6,960	6,083	— 877	14	81,428	+ 3,585
Dundee City	,, 5	1,294	1,354	+ 60	46¾	62,968	+ 3,672
East Ham Corporation	,, 8	1,409	1,214	— 195	1½	1,432	— 166
Exeter Corporation	Mar. 31	304	319	— 15	52	19,123	+ 1,159
Glasgow Corporation	Apr. 8	21,028	22,303	+ 1,275	45	974,925	+ 72,305
Glasgow Subway	,, 8	1,046	1,221	+ 175	14	17,509	+ 2,175
Glossop (U. Elec. Supp.)	,, 8	131	135	+ 4	15	1,920	+ 279
Halifax Corporation	,, 4	2,537	1,392	— 1,145	1	1,392	— 1,145
Do. Motor Omnibuses	,, 4	61	30	— 31	1	30	— 31
Hastings & District	,, 7	1,074	836	— 238	14	10,124	— 272
Huddersfield Corp.	,, 8	3,386	2,778	— 608	1	2,778	— 608
Hull Corporation	,, 8	3,289	2,948	— 341	1	3,459	— 1,304
Ilford U.D.C.	,, 8	702	650	— 52	2	782	— 12
Ilkeston Corporation ...	,, 12	115	122	+ 7	2	247	— 5
Ipswich Corporation	,, 8	504	454	— 50	1	540	— 62
Isle of Thanet	,, 8	470	256	— 212	27	6,781	— 1,299
Kilmarnock Corp.	,, 8	167	157	— 10	47	7,797	+ 307
Lanarkshire	,, 6	1,866	2,262	+ 396	14	29,487	+ 5,004
Lancashire United	,, 5	2,094	1,748	— 346	14	22,002	+ 727
Leeds City	,, 8	9,873	9,335	— 538	2	11,487	+ 505
Leicester Corporation ...	,, 8	3,217	3,259	+ 42	14	45,065	+ 5,318
Leith Corporation	,, 8	718	893	+ 175	47	36,116	+ 3,262
Leyton U.D.C.	,, 6	1,936	1,554	— 382	1	1,554	— 382
Liverpool Corporation...	,, 1	72,171	73,021	+ 850	13½	172,473	+ 8,552
Llandudno & Colwyn B.	Mar. 31	290	196	— 94	17½	3,253	— 54
London County Council	,, 22	47,162	44,722	— 2,440	51	2,255,635	— 24,989
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	Apr. 8	189	122	— 67	26½	3,437	— 1,064
Maidstone Corporation..	,, 1	390	317	— 73	⅔	317	— 73
Manchester Corp.	,, 8	18,567	18,239	— 328	1	21,952	+ 1,257
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	,, 30	69	164	+ 95	52	10,151	+ 852
N'castle-on-Tyne Corp.	,, 8	6,132	5,893	— 240	1	5,893	— 240
Newport (Mon.) Corp....	,, 8	871	860	— 11	1½	1,064	...
New St. Helens & Dist.	,, 5	1,278	940	— 338	40	39,728	+ 3,018
Northampton Corp.	,, 7	964	584	— 380	1⅔	584	— 380
Nottingham Corp.	,, 6	4,388	3,306	— 1,082	1	3,306	— 1,082
Oldham Corporation ...	,, 9	2,513	2,298	— 215	2	5,447	+ 432
Portsmouth Corp.	,, 8	2,697	2,515	— 182	2	2,946	...
Preston Corporation	,, 5	1,037	748	— 289	⅚	748	— 289
Provincial	,, 11	2,494	2,329	— 165	27	55,596	+ 3,193
Reading Corporation	Mar. 30	676	752	+ 76	52	40,913	+ 4,408
Rhondda Tramways	,, 23	1,201	1,196	— 5	12	13,818	+ 1,021
Rochdale Corporation...	Apr. 8	1,911	1,757	— 154	51½	2,234	— 680
Rotherham Corp.	,, 12	997	1,299	+ 302	1⅔	2,330	+ 314
Salford Corporation	Mar. 31	2,383	2,923	+ 540	⅓	2,923	+ 540
Sheffield Corporation...	Apr. 9	8,986	9,802	+ 816	2½	20,671	+ 2,618
Southampton Corp.	,, 5	1,479	1,505	+ 26	⅚	1,069	— 409
Southend-on-Sea Corp...	,, 5	1,078	640	— 438	⅚	478	— 122
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 1	772	742	— 30	52	40,948	+ 1,996
Sunderland Corp.	,, 9	1,531	1,617	+ 86	1⅔	2,057	— 360
Sunderland District...	,, 5	770	630	— 140	23	12,956	+ 832
Swindon Corporation ...	,, 5	152	136	— 16	5	152	— 16
Torquay Tramways	Mar. 31	421	411	— 10	13	5,250	— 94
Tyneside Trys. & Tmrds.	Apr. 5	655	560	— 95	14	6,841	— 294
Wallasey Corporation ...	,, 8	1,383	1,216	— 167	1½	1,841	— 294
Walsall Corporation	,, 8	863	790	— 73	15	10,958	+ 1,292
Walthamstow U.D.C....	,, 8	1,043	987	— 56	1½	1,171	— 5
Warrington Corp.	Mar. 23	426	462	+ 36	51	23,882	+ 1,728
West Ham Corporation	Apr. 6	3,394	3,126	— 268	1	3,126	— 268
Wigan Corporation	,, 6	1,653	1,603	— 50	⅔	1,603	— 50
Wolverhampton Corp....	,, 12	979	1,107	+ 127	2	2,008	— 36
Yorkshire (W. Riding)...	,, 9	1,844	1,629	— 215	15	23,801	+ 2,043

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

Tramway Track Construction
AND
Maintenance
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 20.] LONDON, SATURDAY, APRIL 22, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

ILKESTON CORPORATION.

TENDERS FOR UNIFORM CLOTHING.

The Tramways Committee invite tenders for the supply of Uniform Clothing for Motormen and Conductors (male and female).

Particulars and Forms of Tenders may be obtained from G. H. Browne, acting manager.

Sealed Tenders to be sent to Sidney F. James, Town Clerk, Town Hall, Ilkeston, not later than May 15, 1916, endorsed "Tender for Uniform Clothing."

COUNTY BOROUGH OF SOUTHEND-ON SEA.

TRAMWAY UNIFORMS.

The Corporation of Southend-on-Sea invite tenders for the supply and delivery of Uniforms for Motormen and Conductors, extending over a period of two years.

Further particulars and form of Tender can be obtained on application to Mr. Robert Birkett, Borough Electrical Engineer and General Manager, Electricity Works, London Road, Southend-on-Sea.

COUNTY BOROUGH OF WEST HARTLEPOOL.

ELECTRICITY DEPARTMENT.

WATER TUBE BOILERS, ETC.

Tenders are invited for the supply and erection complete of two Water Tube Boilers equipped with Superheaters and Mechanical Stokers.

Conditions of Contract, Specifications, and Form of Tender may be obtained from the undersigned on payment of a deposit of one guinea, which will be returned on receipt of a bonâ fide tender. Sealed tenders, addressed to the Town Clerk, West Hartlepool, and endorsed "Tender for Water Tube Boilers," to be delivered on or before April 28, 1916.

The Corporation does not bind itself to accept the lowest or any tender.

J. W. SPARK,
Borough Electrical Engineer.

Corporation Electricity Department, West Hartlepool.
April 11, 1916.

COUNTY BOROUGH OF SALFORD.

ELECTRICITY DEPARTMENT.

STEEL STEAM PIPES, ETC.

Tenders required by 12 noon on Monday, May 8, 1916, for High-pressure Steel Steam Pipes and Separator. Also separate Tender for Cast-iron Pipes and Valves.

Specifications and all particulars may be obtained from the Borough Electrical Engineer, Electricity Works, Frederick Road, Salford.

COUNTY BOROUGH OF WEST HARTLEPOOL.

TO BUILDERS AND CONTRACTORS.

PROPOSED EXTENSION TO BOILER PLANT AT THE ELECTRIC POWER STATION.

The Corporation is prepared to receive Tenders for the erection of a Circular Brick Chimney Shaft, 100 ft. in height, in connection with the Electric Power Station, adjacent to the Seaton Carew Ironworks.

Plans and specification can be seen upon application at the office of the undersigned.

Tenders, endorsed "Chimney," and addressed to the Chairman of the Electricity Committee, are to be delivered at the office of the Town Clerk, 78, Church Street, not later than noon on Friday, the 28th inst.

The Corporation does not bind itself to accept the lowest or any Tender.

Sureties will be required for the due performance of the contract.

By order,
NELSON F. DENNIS, M.Inst.C.E.,
Borough Engineer.

Municipal Buildings,
April 13, 1916.

POSITIONS VACANT.

NORTHAMPTON CORPORATION TRAMWAYS.

SHIFT ENGINEER WANTED.

Application will be received for the above post at the Power Station, Castle Street, and applicants must send copies of three recent testimonials, together with wages required; such applications to be immediate and addressed to the General Manager, Tramways Depôt, St. James'.

CITY OF BIRMINGHAM.

ELECTRIC SUPPLY DEPARTMENT.

APPOINTMENT OF JUNIOR SHIFT ENGINEER.

Applications are invited for the position of Junior Shift Engineer, required at the new Temporary Station, Nechells. The appointment will be permanent.

Applicants must have had a sound mechanical and electrical engineering training, and must have had previous experience in a large extra-high-tension three-phase power house.

The commencing salary will be £104 per annum, rising at the discretion of the Committee to a maximum of £200 per annum.

Applications (made on forms which can be obtained from the Secretary of the Electric Supply Department), accompanied by not more than three testimonials as to experience, ability, and character, must reach the undersigned not later than April 24, 1916.

R. A. CHATTOCK,
City Electrical Engineer and Manager.

Electric Supply Offices,
14, Dale End, Birmingham.
April 10, 1916.

TRAFFIC INSPECTOR.

Smart Traffic Inspector wanted. Must be used to controlling traffic and arranging running, also ineligible for Military Service. State age, whether married, past experience and enclose copy references, with photo, to Maidstone and District Motor Services, Ltd., Maidstone.

TRAMWAY TICKET CLERK.

Fully experienced Tramway Ticket Clerk required. Must be over military age or otherwise ineligible for Military Service. Give full particulars, age, experience and salary required.—Box 12, "Tramway and Railway World," Amberley House, Norfolk Street, Strand, London, W.C.

Digitized by Google

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 8488 Leeds. MATERIAL AND SUPPLIES.

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.
Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS' SUPERFINE PAINTS
and
EXTRA DURABLE VARNISHES
for
TRAMCARS.

DOCKERS' "HERMATOR" PAINTS AND ENAMELS
for
POLES AND POWER STATIONS.
Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

— (NATURAL, GLAZE, DULL FINISH, OR COLOURED) —
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World
Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, APRIL 22, 1916.

THE TROUBLE IN THE CROYDON DISTRICT.

Having failed in their struggle last year with the London County Council, the executive of the new union of London traffic employees have been casting about for a means of restoring their reputations. Thus they came to the decision to attack the two weaker undertakings in the south-west outskirts. In the case of Croydon Corporation, they availed themselves of the stress of the war to induce the Chief Industrial Commissioner two months ago to offer arbitration on proposals that from the ratepayers' point of view were beyond the bounds of reason. At the time that the South Metropolitan employees left their work last week a ballot was being taken on the question of striking to enforce similar demands. The men, however, came out themselves because of the company's compliance with a request by the Board of Trade to be furnished with a report as to the suitability of women as car drivers. The manager's action in that respect was seized upon as a convenient cloak, but the subterfuge has not impressed the public at this period of national necessity. Hitherto the South Metropolitan and London United Companies have refused requests for arbitration upon their men's demands, and from the shareholders' point of view there is reason to justify the companies in that course. Before abandoning that attitude the South Metropolitan Company ought to have obtained an assurance that the strikers would return to work, irrespective of the refusal of arbitration by Croydon Tramways Committee. The latter have treated the situation with a firmness that does them credit, and their action was on Monday confirmed by the Corporation. In adopting this consistent attitude the Corporation will have the support of the ratepayers, who cannot be expected to relish the idea of a 2½*d.* rate in order to meet exorbitant demands of a standard rate of pay throughout London. The seriousness of the surrender would not have ended with the satisfying of the tramwaymen, for all classes of tradesmen in the employ of the Council would demand enhanced remuneration on the basis of trade union rates for London proper. There can be no justification for such a concession to the tramway employees; the conditions prevalent on the tramways beyond the county boundary are dissimilar in many respects to those obtaining in the London area. One notable difference is that the men are not called upon to pay such high rents. Combined with the loyalty of a considerable number of the Croydon hands, the firmness of the Corporation is likely to lead to the defeat of the strikers. It is regrettable that the directors of the company serving the outer Croydon area have not shown an equal firmness. No doubt they imagined that they were dealing with reasonable men, but the union's first action ought to have disabused their minds upon that point. While inveighling both this company and the London United into a conciliatory attitude, the leaders proceeded to ballot the employees of the latter upon the question of striking in sympathy, as well as declaring their intention of ordering motor omnibuses to keep out of the district. In their later actions the agitators have overreached themselves, and the Croydon Council estimated at its true worth their threat to hold up the whole traffic of London. It is not too late for the companies to adopt a resolute attitude. The Company and the Council should endeavour to find substitutes for the eligible men among the motormen who are on strike. Then when the latter arrive at the trenches they will find themselves sharing the feeling of disgust that animates the men there against those who in the comfort and security of this country become the dupes of agitators, whose operations are a peril to the nation. In no other country would they be permitted to pursue their baneful operations unchecked.

APPLICATIONS TO THE TRIBUNALS.

At Maidstone Military Service Tribunal, Councillor D. T. J. Lyle, Chairman of the Tramways Committee, applied for the exemption of Mr. A. T. Lambert (39), the general manager and electrical engineer, on the ground that he was in a reserved occupation of public utility. Mr. Lyle said he did not think it would be possible to carry on the tramway service without Mr. Lambert, and if the tramways were shut down it would be a serious matter for the town. They were paying £4,448 in interest annually, and £850 for upkeep, which would entail a rate of 6½*d.* in the £, while they paid £2,000 a year to the electricity department. The cars carried 300 workmen three or four times daily, some of whom were employed on munition work. Replying to the military representative, Mr. Lambert said he understood managers of public utility services were exempt. The Military Representative: Curiously enough not in connection with tramways. Drivers, chief store keepers and parcel superintendents are exempt, but you are none of these. The nearest thing I can get is from something you said about being traffic inspector. Are you traffic inspector?—Mr. Lambert: I am. I cover the whole of the traffic.—Conditional exemption was granted.

Application was made to the Oxford Tribunal by the local Electric Tramways Company, who operate motor omnibuses only, for the absolute exemption of their chief engineer, electrician, fitter's mate, unit adjustor, and thirteen motor drivers, on the grounds that their present employ was expedient in the national interests, and that the men were in a certified occupation. Mr. A. A. Tyler, the manager, stated that the company were under a statutory obligation to run omnibus services. To maintain these services it was necessary to retain all drivers now left. The company had ninety-two men in their employ, and thirty-six girls. It was almost impossible to get drivers over military age. Of the 113 men employed at the outbreak of war and those employed since, 119 had gone into the army.—In reply to the military representative, Mr. Tyler said there were 38 drivers. Of these thirteen were attested, eight were married and not attested, three were single and had been rejected, ten were married and had been rejected, and four were married and over age. They worked three men to each two omnibuses. There were about thirty omnibuses, but they could not all be utilised owing to the shortage of drivers. Under the Act, the company had to provide a service to the satisfaction of the Corporation, or pay £5 per day. Women could not be employed as drivers.—Conditional exemption as being in a certified occupation was granted in respect of the chief engineer, the electrician, the fitter's mate, and the unit adjustor. The other thirteen cases were adjourned for two months.

The London County Tramways Department applied to the Westminster Tribunal for the exemption of a motorman, aged twenty-five, a new employee, who was rejected by the army in June. The Council's solicitor said they were short of drivers, but were letting all other men go. Conditional exemption was granted.

Digitized by Google

An Aberdeen conductor, aged forty, applied for exemption on the grounds of his domestic position and for conscientious reasons, but the tribunal passed him for non-combatative service.

Derby Corporation Tramways Committee have applied for the exemption of forty employees, mostly motormen. As the cars were not fitted with magnetic brakes, the management did not regard women as suitable substitutes for motormen. No conductors were asked for, and 52 of them had joined the colours, their places having been chiefly filled by women. Seventeen motormen had also joined the forces. It was urged that if the staff was further reduced and fewer cars run it would not only be a serious inconvenience to the public, but would cause the department to work at a loss. The cases were adjourned to enable the Committee to consider the question of releasing more men.

Portsmouth Tramways Committee have appealed for exemption under the public utility clause for 14 single men, five of whom are at the power station, and nine in the traffic department. The Committee have undertaken that if ineligible men can be secured these men will be released. In all there are 47 single men of military age employed, 22 of them being unfit for army service.

Mansfield Tramways Company have been allowed six weeks' exemption for a motorman in order to see if they could find a man to take his place. Mr. C. R. Walker, the manager, informed the Tribunal that boys were driving cars. The service was much dislocated, especially during the early hours, when colliers needed to be carried to work. Their only male conductors were 14 years of age.

EMPLOYEES' WAGES AND BONUSES.

Considerable discussion was created at the April meeting of Sunderland Council by the Tramways Committee's recommendation for the payment of the following war bonus: Motormen, male conductors, handy-men, and cleaners, 3*s.* 6*d.* per week; inspectors, 3*s.* 6*d.* per week; clerks, 2*s.* per week; and female conductors, 2*s.* per week; and the wages of tramways inspectors be advanced from 7*d.* to 7½*d.* per hour. Councillor G. New (Chairman of the Committee) said the total advance in regard to wages amounted to £78 per year, and in regard to bonuses £624 per year. Councillor G. S. Lawson proposed that the bonuses be struck out. He did not consider they were justified. There was no agitation for them by the men. It was an agitation by a trades union pure and simple. It would lead to demands from all the other employees of the Council, and an outlay of £4,350 a year. Alderman Turnbull pointed out that the Chairman of the Committee was a strong Labour man, and he would propose nothing but what was just. The amendment was defeated by thirty-eight votes to three. Mr. Lawson then proposed that the clerks in the department be paid a bonus of 3*s.* 6*d.*, but this amendment received no support. The Committee's report was adopted.

Belfast Corporation have granted the following bonus to the employees of the Tramways and Electricity Committee: Three shillings per week to those in receipt of 30*s.* a week and under, and 2*s.* per week to those in receipt of over 30*s.* and up to and including 40*s.* per week, this bonus being granted for the full standard hours per week, or pro rata, where full time is not worked, and to be granted only for the period of the war. During the discussion it was stated that the case of the tramwaymen, etc., was not considered in February, when the other employees were dealt with. The men's leaders asked for 5*s.* and had signified their intention of accepting 3*s.* for one set of employees, and 2*s.* for others.

Perth Tramways Committee have granted an increase of 2*s.* per week to car drivers, the increase to continue only during the war.

Dissatisfaction exists among the Aberdeen tramway employees over a proposal to increase the wages of the long-service motormen and conductors by a halfpenny per hour. All the other employees in the various departments of the Corporation are receiving a bonus of 1*s.* 6*d.* per week.

By twenty-six votes to four Dundee Council have rejected a motion requesting the Tramways Committee to receive a deputation from the employees regarding wages and hours of work. Councillor G. A. Johnston (Chairman of the Committee), stated that the grievances existed only in the minds of a few. Referring to a letter received from the general secretary of the Association of Tramway Workers, the Chairman said it was strange that that official was an Alderman in Salford, and in that town the conditions which he demanded for Dundee did not exist.

Doncaster Council have raised their motormen's wages from 6¾*d.* to 7*d.* per hour, and conductors' wages from 5¼*d.* to 5½*d.* per hour.

Exeter Tramways Committee have granted the following increases: Chief inspector, from 30*s.* to 33*s.* 6*d.* per week; inspector, 28*s.* to 30*s.* 6*d.*; fitter, 38*s.* to 40*s.*; car repairer, 30*s.* to 32*s.*; smith, 30*s.* to 32*s.*; skilled labourers 25*s.* to 27*s.* Replying to a question why the conductors had been omitted, Alderman H. B. Varwell (Chairman of the Tramways Committee), said they thought that by starting the lads of 15 or 16 at 10*s.* to 12*s.* a week they were paying a better rate than outside employers. It was also observed that only one lad received less than 15*s.* Uniform was provided, and sick pay was given up to a certain number of weeks.

WOMEN DRIVERS.

On the Berlin tramways there are more than one hundred women engaged in driving the cars, and additions are being constantly made to the number.

Barrow Tramways Company have trained a woman conductor as a driver. She received a week's tuition, and has been driving for two months.

In passing a resolution supporting the action of the Metropolitan Tramways Company's employees concerning women drivers, the union tramwaymen at Cardiff state that they "condemn the employment of females as drivers, especially where there is no necessity for the same." The resolution added that the union men at Cardiff (where there are women drivers) "intend taking a firm stand in the matter in the near future."

Alderman Jackson, general secretary of the Tramways and Vehicle Workers' Union, has asked the Board of Trade and the Ministry of Munitions to receive a deputation in opposition to the employment of women as drivers of tramcars. He has informed those departments that proposals had been brought forward in some of the large towns that women should be so employed. Other towns would probably follow suit, and the workers felt that strong representations should be made as to the undesirability as well as the danger of the suggested innovation. He contended that no case is made out for women being employed as car drivers, or for the assumption that men over military age could not be got for the work.

L.C.C. TRAMWAY MATTERS.

The Tramway Deficiency.

At the meeting of the London County Council on Tuesday last, Sir George Goldie, chairman of the Finance Committee, introduced the estimates for the financial year 1916-17 and in referring to the tramways deficit deprecated the drawing of any conclusions as to the financial prospects of the undertaking from their position under war conditions. They had once more to face a deficiency, although it was not a "loss" in the commercial sense. If the estimated results of this year should be realised, and they had to find a sum of £74,000 to make both ends meet, the reserve fund might barely suffice for the purpose. There would still remain a substantial amount to the credit of the renewals fund, which might be regarded as available, if necessary.

Some satisfaction might be derived from the fact that, according to the latest figures, the results of the year just closed were likely to show an improvement on the original estimate—an adverse balance of £91,614 was expected to be reduced to £64,160, notwithstanding the strike of May, 1915, which occasioned a loss estimated at £100,000.

Legal Proceedings.

The Highways Committee reported that proceedings had been taken against five persons for assaulting the Council's employees. In one case the accused was sentenced to two months' imprisonment, in two cases a fine was imposed, and in the two other cases the summons was dismissed. One person was fined for obstructing a tramcar, and another for stopping an omnibus on the tramway track to pick up passengers. A summons against a man "for allowing his vehicle to break down on the tramway track" was dismissed with costs against the Council.

War Wages of Employees.

Several grades of men in the rolling-stock section having claimed that they were entitled, under an award of July 22, 1915, of the Court of Arbitration, to an advance of 4*s.* a week, to be regarded as war wages, the Highways Committee reported that the matter had been submitted to the Chairman of the Court of Arbitration, for his ruling. As the reply received did not provide a solution of the difficulty, arrangements were made for the matter to be considered by the Rolling-Stock Conciliation Board. This Board met on March 30, 1916, when an agreement was reached under which certain classes of employees will receive the advance of 4*s.* per week, to be regarded as war wages and to be recognised as due to and dependent on the existence of the abnormal conditions now prevailing in consequence of the war. The cost of giving effect to this agreement, the acceptance of which the Highways Committee recommended, is estimated at £5,650 during the current financial year.

Foundations for Turbo-Generator.

The following tenders were received for the construction of foundations for the third additional turbo-generator at the Greenwich generating station:—

W. Downs, Ltd., Walworth (accepted tender)	£4,751
W. Manders and Company, Leyton	4,927
G. Godson and Sons, Kilburn Lane	4,980
J. Jarvis and Sons, Ltd., Hackney Road	5,290
J. E. Whiter and Company, Newington Butts	5,449
James Ford, Willesden Junction	6,450
Charles Wall, Ltd., Chelsea	6,583

The architect's estimate, comparable with the tenders, was £4,500.

Electric Traction Glow Lamps.

The Stores and Contracts Committee reported that tenders for the supply of electric traction-glow lamps for the tramways department would be received on May 1, 1916. As the value of the contract will exceed £500, they recommended that the Committee, or the chairman or the vice-chairman of the Committee, be authorised during the Easter recess to open the tenders received.

RHONDDA TRAMWAYS AND MUNITIONS.

The Secretary of Rhondda Tramways Company has informed the Urban District Council that unless there was an improvement in the supply of car labour the tramway service would have to be considerably curtailed. A curtailment would seriously inconvenience colliers, and it was feared that it would also seriously interfere with the output of coal. The present service was only maintained by the goodwill of the motormen, who worked very long hours. The Ministry of Munitions had been requested to certify the occupation as being reserved, but the Ministry could not accede to the request as it "did not consider the tramway facilities as of sufficient importance in the carrying on of munitions work." The letter asked that pressure be brought upon the Ministry of Munitions by the miners' representatives. The Council referred the letter to the miners' society.

Digitized by Google

BELFAST GENERAL MANAGERSHIP.

When the recommendation of the Tramways Committee as to the salary of the new general manager to be appointed came before the Belfast Corporation, Councillor Alexander moved an amendment that the initial salary be fixed at £800 instead of £700. He went on to remark that the Corporation would have an opportunity of establishing a praiseworthy precedent by selecting one of their own countrymen to fill the position. Upon another councillor objecting to the remark, the speaker replied that it would be in order for him to move that they should add to the advertisement for general manager the words—"An Irishman preferred." The increase was agreed to.

The following advertisement, which does not appear to have been inserted in any newspaper published in England or Scotland, appeared in the Belfast newspapers of April 15:—

CITY AND COUNTY BOROUGH OF BELFAST.

APPOINTMENT OF GENERAL MANAGER OF TRAMWAYS.

Applications are invited for the above-named appointment. The gentleman to be appointed will be required to enter on his duties at 1st September, 1916. The salary attaching to the position is £800 a year, rising by annual increments of £50 to £1,000. Application must be made on an official form, which, with print of the Conditions of Appointment, can be had from the undersigned, with whom all applications must be deposited not later than the 13th May. R. MEYER, Town Clerk.

MISCELLANEOUS NEWS AND NOTES.

This Week's Issue.—Friday of this week being Good Friday, this issue went to press on Wednesday, and the prices of tramway shares given on page 319 are consequently those recorded on the Stock Exchange on Tuesday.

Privilege Tickets at Burnley.—The Tramways Committee have increased the charges for privilege tickets by 7½ per cent.

Sheffield Tramcar Collections.—The sum of £7,376 has been collected on the tramcars at Sheffield for war funds.

Seats for Women Conductors.—Liverpool Tramways Committee are considering a proposal to provide seats for the women conductors.

Lease of Swinton and Pendlebury Tramways.—An agreement has been arrived at to lease the Swinton and Pendlebury Council's Tramways to Salford Corporation for twenty-one years.

Edison Railway Cars.—Owing to the economical working of a 30-ton Edison battery car on the Cambridge and Indiana Railroad the company have ordered a second car from the same makers.

Extension of Running at Newcastle.—Since April 14 the service of cars at Newcastle-on-Tyne has been extended to about an hour later, the last car on some routes leaving shortly after 11 p.m.

Association of Signal Superintendents.—The Association of Railway Companies' Signal Superintendents and Signal Engineers will hold its fifty-second conference at the Railway Clearing House, London, on Thursday, May 11.

Discontinuance of Dining Cars.—The London and North-Western Railway Company announce that all breakfast, luncheon, tea, and dining cars will be discontinued from May 1 next. Cold luncheon baskets will be served as far as possible in the principal trains.

Belfast and Zeppelin Raids.—A circular has been issued by the general manager of the tramways giving conductors and drivers instructions what to do in the event of an air raid. The object is to ensure prompt and concerted action in getting the cars as quickly as possible to the respective depôts.

Increased Fares in the Rhondda Valley.—In the discussion on a letter received by Rhondda Council from the Tramways Company, intimating that the shortage of car labour was becoming acute, a councillor observed that the communication made no reference to the recent increase of fares.

Loans for Storage Batteries.—The Local Government Board has, on an application made by the British Electrical and Allied Manufacturers' Association, extended the period for the repayment of loans in respect of storage batteries from seven years to ten years, satisfactory guarantees being given.

Rail and Road Motor Lorry Experiment.—Bradford Tramways Committee have sanctioned the carrying out of an experiment by Mr. C. J. Spencer, the general manager, in equipping an electric motor lorry for use both on and off the tramways, or to place an order for a suitable petrol chassis, as he may think fit.

Trailers for the M.E.T.—The Metropolitan Electric Tramways Company have applied to the Board of Trade for sanction to the use of trailers for the conveyance of munition workers. Kensington Council have been advised by a committee to raise no objection to the running of such cars in their district during the period of the war only.

Soldiers and Free Rides.—Warrington Council have decided that able-bodied soldiers must pay for their car rides, but soldiers in hospital uniform are to be permitted to travel free, provided that not more than twelve use the same car or omnibus at the same time. It is alleged that men from the barracks had abused the privileges hitherto granted.

Exeter Chairman's Warning.—In upholding the Tramways Committee's refusal to grant reduced fares to the Exeter Nursing Association, Alderman Varwell, chairman of the Committee, said that the undertaking would not bear any reduction of receipts. Heavy expenditure lay ahead in the matter of replacements, and already the reserve fund was £7,000 behind.

Electric Wagons for Sheffield.—The Health Committee have agreed to purchase a 3-ton and a 2-ton electric tipping wagon from Edison Accumulators, Ltd., at £1,200 and £1,000 respectively. The Committee have for some time been using two 2-ton battery tipping wagons, and a third vehicle of like capacity was due for delivery early in April.

Corrosion of Steel Guard Wires.—Swansea electrical engineer has reported that a number of breakdowns of overhead equipment on the Morrison tramway route were due to the falling of guard wires. The tramways company have decided to re-equip about six miles of line with bronze guard wire, owing to the steel wire having become badly corroded.

The "Practical Engineer" Pocket Book.—We have received from the Technical Publishing Company, 1, Gough Square, London, E.C., the 1916 issue of the "Practical Engineer" Pocket Book and Diary. This is the companion volume to the Electrical Pocket Book and Diary. There are 641 pages of text, dealing with every aspect of mechanical engineering. The information is thoroughly indexed, and the volume is a marvel of cheapness at 1s. 6d.

Need for Side Guards.—At an inquest held at Barrow on a four-year-old child who came from behind a standard and was knocked down by the corner of a tramcar, the Coroner remarked that three fatal accidents had happened within a few months through what would appear to be a defect in guarding the side of the car at the front platform. The children had happened to catch something in that blank space, and had been drawn under the footboard. He urged the company to devise a protection against such mishaps.

Use of Salt on Conduit Lines.—The London County Council have forwarded a letter to the borough councils pointing out that the use of salt for melting the snow considerably disorganised the tramways service owing to development of electrical defects in the ploughs and the conduit cables. The Council express the hope that the various authorities will bear in mind the great advantages which in certain districts of London have been shown to result from the use of mechanical rotary sweeping machines for clearing the roads of snow and slush.

Northampton Tramways Service.—The cars of the Northampton Corporation Tramways have ceased to run after 8 p.m. The traffic returns showed a decrease of £380 for the week ended April 7. This was mainly due to the fact that the corresponding return for the previous year was for nine days, including the Easter holidays. Trouble has arisen with the employees consequent upon the reduction of their time by about fourteen hours a week. The Committee have offered to pay half wages for the time lost, but the men have asked for a deputation to be received.

A Suggestion for Meeting Congestion.—In submitting his annual statement to Leeds Corporation, Alderman H. C. Wilson, chairman of the Finance Committee, said that hundreds of persons were left standing in the streets because there was not enough labour to run all the cars. He would like the city to adopt the American plan of straphanging and hanging on to the step. In America, people were allowed to hang on to the step and if they had not their fare ready they were thrown off. There was no cruelty in the case of electricity, and the centre of gravity being where it was, the loading up of the lower floor was good. Replying to a councillor who asked what about the health of the people, the Alderman said it was much better to suffer inconvenience on the short run home than to stand in the street and get wet.

The Croydon Strike.—A fair service continues to be maintained on the Croydon and South Metropolitan Tramways. On the Croydon undertaking the loyalty of the women conductors is prominent. Those of the women for whom cars have not been available have proved a worry to the union pickets at the Thornton Heath Depôt. On one occasion they took in hand a motorman who was threatening to cease work because he had been too long without food. They speedily secured refreshment for him. A number of wounded soldiers have offered their services as conductors. On Monday last the Corporation discussed the proposal to submit to arbitration the questions involved in the tramway strike. In spite of an appeal by the Mayor in favour of arbitration, the proposal was defeated by 34 votes to 17. A further resolution that five well-known local residents should be requested to arbitrate was also lost by 26 votes to 22. The councillor, who acts as organiserof the men's union, said that this decision might lead to a general strike of vehicle workers in the metropolis.

Edinburgh Tramway Policy.—Councillor Harrison, convener of the Tramways Committee, on April 13, submitted to Edinburgh Council the report on the cable tramways, to which reference was made in our issue of April 15. The convener, in proposing its adoption, mentioned that the committee had also received from Mr. J. B. Hamilton, of Leeds, estimates of the cost for a complete new service of cable cars, and advice regarding the number of months required to supply these. It was not for the public advantage that these reports should be published at the present time. In seconding, Councillor Carter said that measures ought to be taken to repair the track.—Councillor Scott said that whereas the directors of the company might have thought £75,000 was the price for a going concern, could they now be asked if they adhered to it, seeing that the tramways were not going at all?—Councillor Harrison replied Mr. Scott might go to the Tramways Company and inquire for himself.—Later on Councillor Harrison said that so far as he knew there would be no further advances to the company by the committee. On the motion of Councillor Robertson, the Corporation requested the Committee to submit within three months a report dealing with the future policy and method of traction to be adopted on the expiration of the lease in 1919. The Town Clerk was asked to prepare a report giving a comprehensive view of the whole present position, including repairs.

Digitized by Google

PERSONAL.

Dr. E. Hopkinson has been appointed a member of the Indian Commission on Industrial Development.

Mr. J. G. Potts, superintendent of Bury Council Electricity Works, has had his salary increased from £180 to £200.

2nd Lieutenant H. P. Bramwell, who at the outbreak of the war was with the British Thomson-Houston Company, has been wounded while engaged in photographic work in an aeroplane.

Corporal J. W. Smith, a Nelson Corporation tramcar conductor, has been awarded the D.C.M. The Tramways Committee have passed a resolution expressing appreciation of his gallantry.

Mr. H. Dickinson, Liverpool city electrical engineer, has accepted an invitation to advise Wigan Council as to the improvement of their electric supply undertaking. The fee will be 150 guineas.

Mr. S. L. Pearce, city electrical engineer, Manchester, has been permitted by the City Corporation to advise the authorities of Rochdale, Chesterfield, and Stafford on proposed extensions of their electricity works.

General Managership of Oldham Tramways.—Forty-seven applications were received for the post of general manager of Oldham Corporation, and the Committee selected the following candidates to attend at Oldham on Tuesday last:—Mr. H. Pilling, general manager, Accrington Corporation Tramways; Mr. W. Billington, assistant manager, Salford; Mr. J. Brierley, chief inspector, Oldham; Mr. F. Buckley, general manager, Wigan; Mr. W. Chamberlain, joint electrical engineer and manager, Oldham; Mr. H. J. Jackson. chief assistant to the traffic superintendent, Manchester; Mr. A. Eardley, manager, Stockport; Mr. P. Priestley, general manager and engineer of Mexborough and Swinton; Mr. J. Wood, general and confidential assistant to the manager at Liverpool.

CONTRACTS AND ORDERS.

Sunderland Council have allotted the following contracts:—Babcock & Wilcox, Ltd., superheater tubes; Messrs. G. and J. Wear, impellers for boiler feed pumps; Dussek Bitumen Co., box compound.

Bradford Electricity Committee have accepted the following tenders:—Musgrave and Co., Ltd., induced draught plant and two steel chimneys; Electromotors, Ltd., three fan motors; Ferranti, Ltd., two 250 k.v.a. transformers.

FINANCIAL REPORTS AND MEETINGS.

Rio Tramway, Light and Power Company.—The directors have declared a dividend of one and one quarter per cent. on the issued capital stock.

Winnipeg Electric Railway Company.—For 1915 the net earnings were $1,331,737, compared with $1,685,093, for the previous year. After providing for fixed charges and dividends amounting to nine and one half per cent., there was a deficiency of $388,898, reducing the surplus brought forward to $782,598.

Depression at Yarmouth.—Last summer there was again a shortage of visitors to the east coast, with the result that the Great Yarmouth Tramways receipts for the year ended March 31 show a decrease of £5,751. The number of passengers was 1,097,760 less, and the decrease in mileage 132,613. On April 11 the Tramways Committee decided to reopen a fifteen-minute service on the Vauxhall Station and Wellington Pier route.

Manchester Tramways and Rate Relief.—The Manchester Tramways Committee have agreed to pay a contribution of £100,000 in relief of the rates, as on two former occasions, but in order to do this they will have to take £10,865 from the reserve fund. The total revenue for 1915-16 was £939,416, as against £901,876 and £925,310 in the two preceding years. The car miles in 1915-16 numbered 18,486,440, as compared with 19,155,051 and 19,463,646. Allowances to employees on active service totalled £31,764.

Yorkshire (Woollen District) Electric Tramways Company.—The report for 1915 states that revenue amounted to £71,594, being an increase of £6,209. After deducting all expenses chargeable to revenue, including repairs and maintenance, payments to local authorities under agreements, debenture and other interest, and setting aside £5,000 to renewals fund, there remains £13,363, which, added to £2,587 from last account, makes an available balance of £15,949. It is proposed to apply to reserve fund £4,000, to pay a dividend at the rate of 4½ per cent. per annum on the ordinary shares, and to carry forward £2,948.

Cork Electric Tramways and Lighting Company.—The directors' report for 1915 shows that the revenue was £63,905 and the expenses £42,415, leaving £21,490, plus £2,480 brought forward. Interest on debentures requires £4,600, and 5 per cent. preference dividend £6,163. The sum of £6,500 is added to depreciation and renewals reserve, £1,776 is to be written off wiring consumers' premises, £890 written off investments, and £4,041 is to be carried forward. Lighting and power business continues to show satisfactory progress. The number of passengers carried was 5,899,003, as against 5,858,904 in 1914; the car mileage was 870,094, as against 832,227.

L.C.C. Tramway Receipts.—The receipts from April 1, 1915, to March 29, 1916 (fifty-two weeks, less two days) were £2,299,705, a decrease of £27,382 as compared with the corresponding period of last year, which included one day more. The number of passengers during the week ended March 29 was 10,576,535, a decrease of 465,278 over the corresponding period. Owing to adjustments to be made, principally on account of through running, the total receipts for the year—i.e. up to March 31—have not yet been ascertained. The route mileage was 141.67 miles. For the five days ended April 5, 1916, the receipts were £33,560, as compared with £37,872 in the corresponding period, a decrease of £4,312; the number of passengers being 7,938,557 as compared with 8,564,708, a decrease of 626,151.

Potteries Electric Traction Company, Ltd.—The report for the year ended December 31, 1915, shows that the revenue amounted to £136,167 and the traffic receipts to £119,872, the latter being an increase of £4,789. After deducting all expenses chargeable to revenue, including £11,269 for debenture and other interest, there remains £40,872, an increase of £5,047 as compared with 1914. Adding £1,698 brought forward, there is an available balance for distribution of £42,570, which the directors recommend should be allocated as follows:—Reserve account, £8,036; renewals account, £10,000; dividend on preference shares (5 per cent), £12,250; dividend on ordinary shares (3 per cent.), £7,350; balance forward, £4,934. The reserve will then stand at £36,824, and the renewals account at £35,738. The receipts from the tramways and omnibus services showed satisfactory increases during the second half of the year, but owing to the shortage of labour, working conditions were exceedingly difficult.

Dublin and Lucan Electric Railway Company.—At the annual meeting Mr. J. W. Hill (chairman) said that the cost of all materials was steadily rising. For the past two years they had been unable to pay any dividend on the preference capital. In order to increase their receipts, the directors had increased both passenger and goods rates. The new rates, which came into operation on March 25 were considerably lower than the statutory fares the Company were authorised to charge. Although the cessation of tourist and excursion traffic had reduced the receipts by £54, goods and parcels were £104 up. The total receipts were £7,510, the highest the company had experienced. Unfortunately, the cost of working more than counterbalanced the higher receipts. The gross receipts were £144 more, but the expenditure increased by £208. After providing for debenture interest to date, there was an available balance of £528 5*s.* 7*d.*, which the directors recommended be carried to the next account, postponing the payment of the cumulative preference dividend for the present.

Fife Tramways, Light and Power Company.—According to the report for 1915, the profits for the year, together with the balance carried forward after paying loan interest and interest on debenture stock, and providing instalments for debenture stock redemption, amount to £19,980. From that sum six per cent. on preference shares for the half-year has been paid, absorbing £5,382, and leaving a balance of £14,598, which the directors propose to deal with thus:—six per cent. interest on preference shares for the half-year to the end of December, absorbing £5,029; three and a half per cent. interest on the ordinary shares, £2,830; transfer to the reserve account, £3,000; carrying forward £3,737. The increased earnings on power and lighting were sufficient to make up the deficiencies in the revenue from the tramways. Mr. W. Low, who presided at the annual meeting, said the earnings of the Dunfermline and District Tramways Company decreased by £1,600, being £13,650. This was satisfactory, keeping in view the very difficult conditions. So far, the current year showed a substantial improvement. The company had obtained powers for an extension of time in which to build tramways to the south of Dunfermline and for additional lines from Dunfermline to Rosyth and Inverkeithing, and from Lochgelly to Kinglassie. Pending receipt of the Treasury consent to issue the necessary capital, they did not propose to make any arrangements for dealing with these tramways.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended April 8, the latest period for which full returns are available, give total receipts of £181,793, or £5,916 less than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £76 19*s.* 4*d.* per mile of single track, and last year at the rate of £81 18*s.* 8*d.*, thus showing a decrease for the week of £4 19*s.* 4*d.* per mile open. The decrease is due to the occurrence of Easter Monday in the corresponding week last year.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Apr. 18.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	68⅝	68⅝
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4½	7¼	72/6
4%	4%	Do. 4% Deb. ...	100	91	73¾	74¼
4½%	4½%	Do. 4½% Deb. ...	100	98½	73	73
5%	5%	Do. 5% Deb. ...	100	96	78½	78½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92¼	92½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10⅛	10⅛
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97
$½	$1.	Brazilian Trac. & Power Ord. ...	$100	66	55¾	53⅞
$1½	$1½	Do. 6% Cum. Pref.	$100	97	91 3/32	92½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	88/9	88/9
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	39¼	37¼
5%	5%	Do. 5% Cum. Pref.	100	103	52½	51½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	62¾	62¾
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	71	70¼
70/-	70/-*	Do. 7% Pref.	100	55½	45½	44
—	—	Do. 6% Pref. Ord.	100	17½	16¾	15¾
—	—	Do. Def. Ord.	100	11	9⅝	9⅝
5%	5%	Do. 5% Deb.	100	92	78½	78¼
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70¼	70¼
5%	5%	B.A. Lacroze 5% Mt. Deb.	100	100	89	89
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¼	6 15/32	6 15/32
1/3	1/3	City of B.A. Trams.	5	5½	92/6	91/10½
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11⅜	11⅜
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	6/-	Lanarkshire Trys. Co.	10	10⅜	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1¾d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	15/16	7/9	8/3
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89¼	89¼
5%	5%	Do. 5% Inc. Deb.	100	88½	78½	78½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	49½	48½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/6	98/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	68	65
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78¾	78¾
$1½	$1½	Mexico Trams. Common ...	$100	70	22⅝	23½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40¾	40½
6%	6%	Do. 6% Mt. Bds.	100	76	34¼	34¼
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/2*	1/2½*	National Steam Car	1	15/32	13/-	12/1½
9¾d.*	9¾d.*	New General Traction	1	⅞	7/9	7/9
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	25/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4¼	53/5	55/-
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/6	10/6
8d.	10d.	Provincial Trams. Ord.	1	⅞	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	90¼	90
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74⅜	74¼
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88	88½
5%	5%	Do. 5% Perp. Deb.	100	99½	78	77½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	88¾	88¾xd
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	74	73¼xd
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Increase or Dec.
Anglo-Argentine	Apr. 15	£53,734	£53,462	16	£765,771	+ £2,699
Auckland (28 days)	Mar. 10	19,907	20,711	36	189,937	+ 3,002
Ballarat and Bendigo	Feb. 27	3,469	3,512	48	39,843	— 2,718
Brazilian Traction Mlrs.	Feb.	5,797,500	6,079,000	9	12,509,000	+ 715,310
Brisbane	Mar.	30,740	34,275	13	96,875	+ 9,925
British Columbia $	Feb.	558,512	572,935	35	4,405,030	— 792,876
Buenos Aires Lacroze	Mar.	44,332	42,219	39	372,882	— 6,594
Burmah Tramway Rs.	Apr. 15	3,473	3,690	37	...	+ 7,622
Calcutta Rs.	,, 15	63,972	69,389	16	1,024,806	+ 65,369
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias	Mar.	2,436	2,991	13	7,417	+ 2,255
Cordoba	Feb.	11,534	11,831	48	148,308	+ 5,399
East India	Mar.	1,846	2,196	35	16,590	+ 1,214
Hong Kong $	Mar. 18	9,800	11,005	14	149,440	+ 17,311
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Mar.	34,185	34,159	13	101,073	+ 3,681
Lisbon Escu.	Feb.	...	163,012	9	346,894	...
Madras (2 weeks) Rs.	Apr. 16	28,604	30,818	15	219,109	+ 21,418
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Jan.	62,729	69,879	5	69,879	+ 7,150
Mexico $	*	...	...	...	...	...
Montevideo	Mar.	29,716	31,956	21	158,422	+ 10,553
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai $	Mar. 15	24,313	27,064	...	...	...
Singapore $	Mar. 11	10,864	12,935	10	122,392	+ 16,497
Toronto $	Feb.	767,326	846,256	9	1,752,606	+ 141,929
Winnipeg	Feb.	314,658	293,250	9	590,810	— 74,530

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	Apr. 11	£324	£363	+ £39	2	£595	— £103
Aberdeen Corporation	,, 12	1,620	1,667	+ 47	45	80,194	+ 5,017
Accrington Corp.	Feb. 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	Apr. 15	279	279	nil	49	16,899	+ 1,037
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 16	1,253	1,388	+ 135	2½	3,247	— 82
Birmingham Corp.	,, 8	13,995	16,178	— 2,182	1⅞	19,345	— 347
Do. Motor Omnibuses	,, 8	863	842	— 21	1½	1,003	— 186
Blackburn Corp.	,, 12	1,167	1,115	— 52	2⅔	2,870	— 600
Blackpool & Fleetwood.	,, 15	397	332	— 65	15	4,725	— 617
Blackpool Corp.	,, 13	705	730	+ 25	2	1,945	— 1,134
Bolton Corporation	,, 16	2,612	2,619	+ 7	3	6,403	— 808
Bournemouth Corp.	,, 12	2,163	2,057	— 106	2	3,651	— 1,148
Bradford Corporation	,, 8	7,521	6,400	— 1,121	2	8,002	— 2,443
Brighton Corporation	,, 16	945	910	— 35	2⅔	2,206	— 442
Bristol	,, 14	9,957	9,755	— 202	15	137,259	+ 6,991
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	,, 15	1,541	1,602	+ 61	3	4,838	— 135
Burton-on-Trent Corp.	,, 16	267	240	— 27	2	530	— 128
Bury Corporation	,, 9	1,447	1,308	— 139	1⅔	1,895	— 533
Cardiff Corporation	Mar. 25	1,554	2,614	+ 1,060	51	138,838	+ 1,370
Chatham & District	Apr. 13	1,081	1,139	+ 58	15	15,571	+ 570
Chesterfield Corp.	Mar. 31	206	281	+ 75	52	13,992	+ 155
Colne Corporation	Apr. 15	259	242	— 17	...	...	...
Cork Electric	,, 13	481	465	— 16	15	6,663	+ 15
Croydon Corporation	Mar. 24	1,678	1,628	— 47	51	91,800	+ 5,097
Derby Corporation	Apr. 15	959	1,046	+ 87	2½	1,046	+ 87
Dover Corporation	,, 8	299	280	— 19	1½	330	— 127
Dublin & Lucan	,, 14	127	130	+ 3	15	1,725	— 159
Dublin United	,, 7	6,960	6,083	— 877	14	81,428	+ 3,585
Dundee City	,, 12	1,346	1,325	— 21	47⅔	64,294	+ 3,653
East Ham Corporation	,, 15	1,291	1,231	— 60	2½	2,663	— 226
Exeter Corporation	Mar. 31	304	319	— 15	52	19,123	+ 1,159
Glasgow Corporation	Apr. 15	21,205	22,533	+ 1,328	46	997,458	+ 73,781
Glasgow Subway	,, 15	1,068	1,247	+ 179	15	18,757	+ 2,355
Glossop (U. Elec. Supp.)	,, 15	116	124	+ 8	16	2,045	+ 287
Halifax Corporation	,, 11	2,006	2,023	+ 17	1⅓	3,415	— 1,128
Do. Motor Omnibuses	,, 11	45	36	— 9	1½	66	— 40
Hastings & District	,, 14	915	783	— 132	15	10,907	— 404
Huddersfield Corp.	,, 8	3,386	2,778	— 608	1	2,778	— 608
Hull Corporation	,, 15	2,982	3,058	+ 76	2	7,745	— 1,227
Ilford U.D.C.	,, 15	588	644	+ 56	3	1,426	— 43
Ilkeston Corporation	,, 12	115	122	+ 7	2	247	— 5
Ipswich Corporation	,, 15½	399	420	+ 21	2	961	— 42
Isle of Thanet	,, 15½	326	245	— 81	28	7,026	— 1,380
Kilmarnock Corp.	,, 15½	162	165	+ 3	48	7,962	+ 311
Lanarkshire	,, 13	1,833	2,106	+ 273	15	31,593	+ 5,277
Lancashire United	,, 12	1,567	1,648	+ 81	15	23,656	+ 803
Leeds City	,, 8	9,873	9,335	— 538	2	11,487	+ 505
Leicester Corporation	,, 15	2,801	3,200	+ 399	15	48,265	+ 5,736
Leith Corporation	,, 15	677	798	+ 121	48	36,914	+ 3,384
Leyton U.D.C.	,, 6	1,936	1,554	— 382	1	1,554	— 382
Liverpool Corporation	,, 8	13,772	13,665	— 107	14½	186,138	+ 8,445
Llandudno & Colwyn B.	,, 14	323	236	— 87	19⅓	3,706	— 397
London County Council	Mar. 29	46,463	44,069	— 2,394	51⅞	2,299,705	— 27,382
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	Apr. 15	166	124	— 42	27½	3,561	— 1,106
Maidstone Corporation	,, 13	188	189	+ 1	2	506	— 72
Manchester Corp.	,, 15	16,869	17,670	+ 801	2	39,622	+ 2,138
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	,, 30	69	164	+ 95	52	10,151	+ 852
N'castle-on-Tyne Corp.	,, 8	6,132	5,893	— 240	1	5,893	— 240
Newport (Mon.) Corp.	,, 8	871	860	— 11	1½	1,064	...
New St. Helens & Dist.	,, 12	890	904	+ 14	41	40,632	+ 3,003
Northampton Corp.	,, 14	633	600	— 33	2	1,184	— 413
Nottingham Corp.	,, 13	3,424	3,698	+ 274	2	6,998	— 814
Oldham Corporation	,, 16	2,137	2,214	+ 77	3	7,661	— 355
Portsmouth Corp.	,, 15	2,455	2,452	— 3	3	5,398	...
Preston Corporation	,, 12	856	964	+ 108	1⅞	1,713	— 180
Provincial	,, 15	2,147	2,171	— 24	28	57,768	+ 3,216
Reading Corporation	Mar. 30	676	752	+ 76	52	40,913	+ 4,408
Rhondda Tramways	,, 30	1,088	868	— 220	13	14,785	+ 801
Rochdale Corporation	Apr. 8	1,911	1,757	— 154	51⅛	2,234	— 680
Rotherham Corp.	,, 12	997	1,299	+ 302	1⅞	2,330	+ 314
Salford Corporation	Mar. 31	2,383	2,923	+ 540	⅛	2,923	+ 540
Sheffield Corporation	Apr. 16	8,226	9,733	+ 1,507	3	30,404	+ 4,161
Southampton Corp.	,, 5	1,479	1,505	+ 26	⅝	1,069	— 409
Southend-on-Sea Corp.	,, 12	754	648	— 106	2	1,126	— 228
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 8	830	714	— 116	1½	884	— 104
Sunderland Corp.	,, 16	1,357	1,507	+ 150	2	3,565	— 209
Sunderland District	,, 5	770	630	— 140	23	12,956	+ 832
Swindon Corporation	,, 12	180	178	— 2	1⅞	314	— 17
Torquay Tramways	,, 6	775	496	— 279	14	5,746	— 185
Tyneside Trys. & Tmrds.	,, 5	655	560	— 95	14	6,841	— 294
Wallasey Corporation	,, 15	1,117	1,174	+ 57	2½	2,615	— 401
Walsall Corporation	,, 15	633	776	+ 143	16	11,733	+ 1,434
Walthamstow U.D.C.	,, 15	778	942	+ 164	2	2,113	+ 164
Warrington Corp.	Mar. 23	426	462	+ 36	51	23,882	+ 1,728
West Ham Corporation	Apr. 6	3,394	3,126	— 268	1	3,126	— 268
Wigan Corporation	,, 13	1,407	1,574	+ 167	2	2,948	— 369
Wolverhampton Corp.	,, 12	979	1,107	+ 127	2	2,008	— 36
Yorkshire (W. Riding)	,, 16	1,443	1,557	+ 114	16	25,358	+ 2,157

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION

AND

MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,

AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 22.] LONDON, SATURDAY, APRIL 29, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

PORTSMOUTH CORPORATION TRAMWAYS.

CONTRACT.

The Tramways Committee invite Tenders for the supply and delivery of:—

Uniform clothing for Conductresses' Tunics, Skirts, and Bloomers, and cloth and straw Caps, for one year.

Specifications and Conditions, and Form of Tender may be obtained, and samples may be seen, on application to the General Manager, Town Hall, Portsmouth.

Sealed Tenders, endorsed "Tenders for Uniform Clothing" or "Caps," as the case may be, to be delivered to the undersigned at the Town Hall, Portsmouth, not later than 12 noon, Monday, May 8, 1916.

The Committee do not undertake to accept the lowest or any Tender, and reserve the right to accept the whole or any portion of any Tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth.
April 29, 1916.

SALFORD CORPORATION TRAMWAYS.

UNIFORMS.

Tenders invited by 3 p.m., May 15, 1916, for 12 months' supply of Uniform for female employees.—Apply to GENERAL MANAGER, Tramway Offices, 32, Blackfriars Street, Salford.

COUNTY BOROUGH OF SALFORD.

ELECTRICITY DEPARTMENT.

STEEL STEAM PIPES, ETC.

Tenders required by 12 noon on Monday, May 8, 1916, for High-pressure Steel Steam Pipes and Separator. Also separate Tender for Cast-iron Pipes and Valves.

Specifications and all particulars may be obtained from the Borough Electrical Engineer, Electricity Works, Frederick Road, Salford.

POSITIONS VACANT.

SWITCHBOARD ATTENDANT.

Switchboard Attendant required for a three-wire D.C. station. Salary 30s. per week.—Apply, stating age, training, etc., and enclosing copies of three testimonials, to the BOROUGH ELECTRICAL ENGINEER, Corporation Electricity Works, Kendal.

MEXBOROUGH AND SWINTON TRAMWAYS COMPANY.

ENGINEER AND MANAGER.

Applications are invited for the above position.

The undertaking consists of tramway 6½ miles in length between Mexborough and Rotherham, with running powers into Rotherham, and a railless traction system of three miles connecting with the tramway at Mexborough. The rolling stock consists of twenty-one cars. The power-house has a plant capacity of 750 kw., and supplies current for power and lighting in Rawmarsh and Swinton.

Applicants must be experienced in the management of a tramway and lighting undertaking, with a thorough practical knowledge of the repair and maintenance of plant and rolling-stock.

Salary £400 per annum.

Applications, with no more than three copies of recent testimonials, to be addressed to

THE SECRETARY,
Mexborough and Swinton Tramways Co.
3, Laurence Pountney Hill,
Cannon Street, London, E.C.

NORTHAMPTON CORPORATION TRAMWAYS.

SHIFT ENGINEER WANTED.

Applications will be received for the above post at the Power Station, Castle Street, and applicants must send copies of three recent testimonials, together with wages required; such applications to be immediate and addressed to the General Manager, Tramways Depôt, St. James'.

ENGINEERING ASSISTANT.

The Corporation of Bacup require the services of a temporary Engineering Assistant. Salary £75 per annum. Candidates must be ineligible for Military Service. Applications, accompanied by copies of two recent testimonials, to be addressed to me, endorsed Engineering Assistant, and delivered by Thursday, May 25, 1916.

Canvassing in any form will disqualify.

JOSEPH ENTWISTLE, Town Clerk.

TRAFFIC INSPECTOR.

Smart Traffic Inspector wanted. Must be used to controlling traffic and arranging running, also ineligible for Military Service. State age, whether married, past experience, and enclose copy references, with photo, to Maidstone and District Motor Services, Ltd., Maidstone.

TRAMWAY TICKET CLERK.

Fully experienced Tramway Ticket Clerk required. Must be over military age or otherwise ineligible for Military Service. Give full particulars, age, experience and salary required.—Box 12, "Tramway and Railway World," Amberley House, Norfolk Street, Strand, London, W.C.

TESTS OF ELECTRIC CAR EQUIPMENT.

By E. C. Parham and J. C. Shedd. Covers a a great variety of necessary stationary and motion tests. Describes tests that have been made with apparatus such as is always available in the car shed and shop. The volume has a complete index. 121 pp. 5 in. × 7½ in. Illustrated. Price 4s. 6d.

Address: "The Tramway and Railway World."

Digitized by Google

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 8488 Leeds. MATERIAL AND SUPPLIES.

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.
Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, APRIL 29, 1916.

NOTABLE RESULTS AT LEEDS AND MANCHESTER.

Whatever the future may have in store for British tramways, the present artificial prosperity of trade and industry has brought a welcome increase in earnings to many undertakings. In the financial year ended March 31 last, Leeds and Manchester tramways, for instance, recorded receipts higher than in any former year. What is more remarkable is that although Manchester's revenue has increased by £38,000, working expenses are £10,000 less than in 1914–15, and £23,000 below those of 1913–14, when the revenue was £14,600 less. In Leeds the total expenses only exceeded those of 1914–15 by £8,000, of which sum £5,511 was due to employees' war bonus. Combined with allowances to dependants of employees, the last-mentioned item involved the great outlay of £92,881 at Manchester. Leeds has once more recorded a percentage of working costs to revenue of under 50 per cent., a performance that in these days is a marvel of good management. The figures under the four headings of expenditure are encouraging in a year that brought difficulty after difficulty due to shortage of staff, cars, and materials. The items are best left to speak for themselves in the appended table, compiled from the averages per car mile given in the reports of the past four years:—

Year.	Traffic Expenses. d.	General Expenses. d.	Repairs and Maintenance. d.	Power Expenses. d.	Total. d.
1912–13	2.985	.984	1.089	.776	5.834
1913–14	2.967	1.073	1.070	.792	5.902
1914–15	2.914	1.016	1.099	.720	5.749
1915–16	2.927	1.051	1.092	.817	5.887

For the past year an average per mile of .141*d.* has to be added to the foregoing table in respect to war bonuses. Included in the electrical equipment costs is an amount of .038*d.* for new tower wagons, while in power expenses the increased charge for coal is represented by .082*d.* Deducting those items the total working costs are 5.767*d.*, practically equal to the notably low figure of the preceding year. To set against an outlay of £19,000 on war allowances and bonus, Leeds can show an income of more than £40,000 over all previous figures, while there is an addition of £5,000 odd to net profit. Like some other war work centres where heavier traffic has had to be carried with fewer cars, Leeds and Manchester show average receipts per car mile exceeding one shilling. Manchester's detailed working expenses are not yet available, but the decrease already referred to would have been greater by £7,000 if the department had been charged the same price per unit for energy as in 1914. The wisdom of establishing an adequate reserve and renewals fund is shown by Manchester having had to divert therefrom three years' contributions in order to meet the cost of war service allowances. It would be better finance if the corporation here and elsewhere could be persuaded to forego so heavy a sum in relief of the rates as is given by Manchester's £100,000, especially as this year the department estimate that they will not only be unable to make any provision for renewals, but will have to meet a revenue deficit by a transfer of £10,800 from the reserve and renewals fund. Another point to be considered is the estimated shrinkage of £67,000 in the value of the securities in which the reserve and renewals fund has been invested.

WOMEN AS DRIVERS.

BOARD OF TRADE SEEK INFORMATION.—LONDON POLICE OPPOSITION.

The Reserved Occupations Committee of the Board of Trade recently asked the Tramways and Light Railways Association and the Municipal Tramways Association to furnish them with "lists of the areas in which women have superseded men as tramcar drivers, showing also how far the change has been carried, and what further action along these lines is contemplated in future." The Secretary of the Tramways and Light Railways Association has since enlightened the innocence of the Reserved Occupations Committee by sending them the following reply from the Council:—"In compliance with the request contained in your letter a circular letter was sent by this Association to all its company members, asking them to supply us with the information asked for. As we were given to understand that a similar step was being taken by the Municipal Tramways Association, we did not approach our municipal members, in order to save confusion. From the returns to hand, it appears that women are actually employed as tramcar drivers by only four companies in Scotland and the West of England respectively. The total number employed so far is fifteen women, but owing to gradients being light, and the working conditions generally favourable for the employment of women, it is hoped by those companies to increase the number up to 50 per cent. of the total, provided the right type of woman can be secured. A few of the smaller companies are considering the matter where the traffic is light and the lines level, but in the great majority of cases it is thought unsafe to use women as drivers, in view of gradients, sharp curves, congested traffic, size and weight of cars, complication of brakes, etc. It is also reported that in a few cases where women were being trained to drive cars, the men have threatened to strike, and in other cases the local authorities are said to be unwilling to grant licences to women."

Mr. Gilbert asked the Home Secretary in the House of Commons on April 19 whether the Metropolitan Police had licensed any women as drivers of tramcars or motor omnibuses; if so, how many licences had been granted; and, if not, could he state the reasons why the police refused to license women for this work.—Mr. H. Samuel replied: No women have been so licensed in the Metropolitan Police District. The Commissioner of Police, who is responsible for the granting of licences, informs me that having regard to the standard of physique and stamina necessary for the proper performance of the duties involved, and to the special traffic conditions of the metropolis, he is not satisfied that women can safely be licensed to drive tramcars and motor omnibuses.

Mr. J. W. Hame, general manager, York Corporation Tramways, recently sent a circular to the drivers and conductors, asking:—(*a*) If the male employees would work with women drivers, (*b*) if the women conductors would care to learn driving, and (*c*) if they were prepared to stand loyally by the Corporation in the event of disturbance with other employees. A few women returned the forms with an affirmative answer to the second question, but all the other drivers and conductors sent back the papers blank. Upon the men informing their union of the inquiry, the secretary asked the Committee to receive a deputation. At a meeting of the Committee, on April 18, a proposal was made that four women should be trained as drivers, but on the casting vote of Alderman S. W. Meyer, the chairman, the Committee decided to take no action until a deputation from the union have made known their views.

In asking Derby military tribunal for the exemption of a number of motormen, Mr. F. Harding, the general manager of the Corporation Tramways, stated that his Committee considered that the work was too heavy for women. Burton had decided not to employ them, and he understood that Nottingham was also averse to the idea. The number of female conductors in Derby was, however, being gradually increased. The military representative observed that nearly fifty women were engaged as drivers at Glasgow. While recognising that there was a difficulty in Derby, owing to the cars not being fitted with magnetic brakes, he thought the Committee might reconsider their decision. As reported in our last issue, the cases were adjourned to enable the Committee to consider the question of releasing more men.

Digitized by Google

Mr. T. J. Kendrew, general manager, Southport Corporation Tramways, has stated that several women are being instructed in driving. In reply to an objection raised by the Tramway and Vehicle Workers' Union, Mr. Kendrew has declared that the Tramways Committee have no desire to supersede the men by women if they could get the right class of men. As proof of this he mentioned that permits had lately been given out for three more male drivers.

Councillor Addison, of Croydon Tramways Committee, who is a motorist, has been working as a motorman since April 17 on the Corporation tramcars. On his first day he was at the controller the unreasonable period of between 10 a.m. to 5 p.m. In the evening he told the Council that the men on the Corporation and company's lines came out ostensibly because two women were being taught to drive on the company's cars. In order to satisfy himself whether it was a reasonable thing to ask women to take up this work, he had been driving a tramcar from ten o'clock that morning until five o'clock in the afternoon. From his experience he had formed the opinion that no manager of a tramway company in his right senses would employ a woman to drive a car.

BRADFORD NOVEL GOODS CAR.

Owing to the shortage of team labour and carting facilities in Bradford, Mr. C. J. Spencer, general manager of the Corporation Tramways, has recently given renewed study to the question of utilising the tramways for the conveyance of goods. He has obtained the sanction of the Tramways Committee and the Board of Trade to experiment with a combined battery and railless trolley vehicle, the accumulators deriving energy from the overhead wires. The battery method of traction will enable the driver to fetch a load from a railway station or warehouse to the nearest tramway track and then utilise the trolley arm for travelling to any part of the city served by the tramways, the final stage of a journey being made if necessary by reverting to battery propulsion. The vehicle would run as a railless trolley car at about the same speed as a tramcar, and it could be worked without interference with the passenger traffic. This, of course, is not the first demonstration of the feasibility of utilising the overhead equipment of a tramway for railless trolley traffic. It has been shown at both Leeds and Bradford—the pioneer railless trolley undertakings in this country—and it was also seen on the West Ham Corporation Tramways, on the occasion of the holding of the Municipal Tramways Conference in London in 1910. It is said that the vehicle constructed by Bradford Tramways department will accomplish the work of ten horses and carts at considerably less cost. An added advantage is that the nature of the haulage is of the kind in which a battery vehicle excels. A successful outcome to the experiment will confer great advantages upon tramway undertakings, besides solving the problem of connecting the tracks with the works, warehouses, and railway stations that it is desired to serve.

TRAMWAYS AND LIGHT RAILWAYS CONGRESS.

The following are the provisional arrangements for the Tramways and Light Railways Association's annual congress, to be held on Friday, June 30:—

2.30 p.m.—Annual general meeting, Westminster Palace Hotel, S.W.

3 p.m.—Paper by Mr. W. Tuke Robson, A.I.E.E., general manager, Southampton Corporation Tramways. Discussion to follow.

4 p.m.—Visit by special omnibuses to the London General Omnibus Company's Training School, Milman Street, Chelsea, where members will be received by Mr. H. E. Blain, operating manager of the L.G.O. Company, and the Underground Railways.

Inspection of class-rooms, drivers' and conductors' courses, mess-room, clothing stores, etc., and cinematograph hall, where special films will be exhibited showing London traffic scenes, with special reference to rules of the road for tramcars, omnibuses, and other traffic methods of training, etc. This will be followed by tea, during which Mr. Blain will give a short address on "The Safety Movement."

7.30 p.m.—Members' dinner at the Trocadero.

The members of the Council to retire by rotation at the annual meeting are Messrs. C. Shirreff Hilton, S. E. Baker, J. W. Dugdale, T. B. Goodyer, H. L. Williams, and John Cameron.

STRIKE IN THE CROYDON DISTRICT.

While Croydon Corporation are continuing to resist the demands of the strikers for arbitration on their exorbitant claims, the South Metropolitan Tramways Company have made another surrender. In addition to agreeing to arbitration, the company decided, on April 25, that on the men returning to work "there shall be no victimisation or marking, and that no South Metropolitan cars be run on the Croydon Corporation route so long as the Croydon strike continues." Thanks to the loyalty of the staff and a number of the employees, Mr. T. B. Goodyer, the general manager, Croydon Corporation, has maintained a good service of cars. In this work the men were assisted by Councillors Addison, Umney (chairman of the Lighting Committee) and Wood Roberts, and Mr. Ransford, a magistrate. From Good Friday to Easter Monday inclusive 34 cars were operated. The police issued summonses against Mr. Mason, the manager of the South Metropolitan Company, and 34 of the lighting and other employees in connection with acting as drivers and conductors without licences. Mr. Mason had informed the local police and the Chief Commissioner of his intention to employ these substitutes on the cars, and asked for temporary licences to be granted. Both the Croydon county and Penge magistrates dismissed the charges, the former doing so "in the interests of the community."

During the week a number of Corporation employees have returned to work, and on the main route thirty-two cars are now running. A number of men, ineligible for military service, have replied to a call to be trained as motormen.

MUNICIPAL OWNERSHIP IN THE U.S.A.

The municipal ownership of tramways is still regarded with strong disfavour in the United States. A few systems that are in the hands of town councils do not appear to have obtained much success, and there is no doubt that the majority of voters in municipalities are disinclined to see any further experiments made in the transfer of ownership of companies to corporations. The cause of municipalisation received a serious blow in the report presented to the National Congress by Mr. S. E. Winslow two or three years ago. This report came out strongly against the plan by which it was proposed that the District of Columbia, in which the capital of Washington is situated, which is under the direct control of the National Congress, should acquire the street railways. The Winslow report showed that the scheme could not be financed under the terms of the proposed bill except at a heavy annual loss, and that the burden of the deficit would fall upon the taxpayers of the district. It appears to have been assumed by the supporters of the bill that the physical value of the undertaking alone would determine, as was the case in this country under the Act of 1872, the amount to be paid for the street railways. In America, however, such an assumption was clearly outside present practice, as the decisions of the Court have been in quite the reverse sense, not to mention the decision of various commissions who were considering the matter at different times. The principal object of those in favour of the municipalisation was the reduction in fares, but this could only be carried out if the tramways were bought at a cost considerably below the market value of the properties. Even if the undertaking had been acquired at an absurdly low figure, with an increase in wages such as was proposed, it was assumed that there would be a large annual deficit. Evidently the Winslow report effectually disposed of the plans, as nothing has since been heard of the project.

SYDNEY AND MELBOURNE ELECTRIFICATIONS.

The New South Wales Public Works Department have announced that the work of constructing the new underground railway in Sydney is expected to be completed in 1919. A beginning with the sinking of shafts and excavations was announced to be made last month. Beyond that little progress is expected for some time owing to the difficulty of securing supplies of steel, etc. In conjunction with this project the Government Railways and Tramways Department have undertaken the electrification of the suburban railways. The cost of the two projects is estimated at £6,000,000, with an addition of £600,000 for rolling stock.

Under an Act passed by the Victorian Legislature in December, 1915, loans to the amount of £3,000,000 are to be issued for the construction of railways, tramways, and works connected therewith. Among the allocations are £800,000 for the electrification of Melbourne suburban railways; £800,000 for rolling stock, equipment, machinery etc.; £800,000 for additions and improvements to way and works; and £660,000 for construction of new lines, etc. The Railways Department have resolved to restrict the electrification scheme and to hold over other works while the war is in progress.

MISCELLANEOUS NEWS AND NOTES.

Collection Boxes in aid of the Newcastle War Relief Fund have been placed on the tramcars.

Ilford Power Supply.—The Urban Council have requested the electrical engineer and the tramways manager to prepare a joint report on the subject of utilising the refuse destructor for generating electricity.

Cedes Electric Traction, Ltd.—An order has been granted by Mr. Justice Neville for the compulsory winding up of the Cedes Electric Traction, Ltd., upon the application of the Tudor Accumulator Company, Ltd.

Northampton Trouble Ended.—The wages difficulty that arose with the Northampton car employees owing to curtailment of the service, in order to guard against air raids, has been settled by restoring the full service.

Mineral Haulage at Leeds.—During the year ended March 31, Leeds Corporation Tramways department received £633 for haulage of minerals for a colliery company from Harehills to their works in Oldfield Lane and Elland Road.

Nottinghamshire and Derbyshire Tramways Act.—The Board of Trade have extended for one year, to Aug. 15, 1917, the period limited by the Act for the purchase of lands required in connection with tramways Nos. 19, 20 and 21, authorised by the Act.

Devonport Tramways Purchase. Plymouth Corporation have received the sanction of the Board of Trade to the borrowing of £111,706 in respect of the purchase of the Devonport and District Tramways Company's undertaking. The repayment is to be spread over thirty years.

Assessment of a Tramway.—The County Court Judge, at Ballymoney, Co. Antrim, has ruled that the Portrush and Giant's Causeway Electric Tramway is to be assessed as a tramway, not as a railway, and that the Portrush Urban Council were therefore entitled to recover £8 in an action against the company for moieties of poor-rate and consolidated town rate.

Digitized by Google

Manchester-Bury Railway Electrification.—The electric railway service on the Manchester and Bury section of the Lancashire and Yorkshire Railway was inaugurated on April 17. A full description of the work, together with fifty-six illustrations, appeared in our issue of January 13 last.

Gifts for Glasgow Tramway Soldiers.—In order to bring up to the minimum weight many of the parcels despatched to the tramways battalion at the front, the department are enclosing magazines and other publications. These are collected by school children for the purpose, and are handed to the car conductors for conveyance to the depôts.

Summer Uniforms for Women Conductors.—In towns where the services of women conductors were not requisitioned until just before the winter, the question of their summer uniform is being considered. At Manchester, the heavy overcoat will give place to a tunic or short jacket. The women will continue wearing straw hats, and are to have leggings of a lighter texture.

Workmen's Tickets at Rawtenstall.—The Council have refused to allow the time for the use of workmen's tickets to be extended. Alderman H. Coupe, chairman of the Tramways Committee, observed that these tickets could be purchased up to 8 a.m., and the holders had to return up to 8 p.m. The munition workers for whom the extension was desired were paid for working overtime.

Easter Traffic.—With no cheap fares available on the railways, the Easter holidays brought much pleasure traffic to tramways. During the four days from Good Friday to Easter Monday inclusive the Bradford receipts were £5,077, as against £4,757 for the previous Easter. At Leeds the Good Friday and three following days' takings totalled £6,669, as compared with £6,131 in 1915. Manchester took £11,781 in four days, as against £10,889; Salford's ingathering being £3,424, as against £3,341.

Omnibuses Relieve Congestion of Passengers.—Birmingham Tramways department have put into service several motor omnibuses which have been delivered out of twelve that were ordered in February last. By this means relief has been given to the congestion on several routes. Owing to the decision of the Tramways Committee to postpone until after the war the scheme for a tramway from Salford Bridge to Tyburn, omnibuses are being provided for the conveyance of workers in that district.

Trailer Cars.—Birmingham Tramways Committee have decided shortly to put a trailer car on the Handsworth route as an experiment. The Metropolitan Electric Tramways, Limited, have applied to the Board of Trade for permission to use trailer cars along the tramways and light railways running from Acton to Paddington, and from Paddington viâ Craven Park and Cricklewood to Hendon in order to meet certain temporary difficulties.

Tramway Companies and the Finance Act.—In the current issue of the "Journal" of the Tramways and Light Railways Association appears an announcement that the Council have decided to make formal application, under Section 42 of the Finance (No. 2) Act, 1915, to the Board of Referees on behalf of all Company Tramways for an increase of the statutory percentage laid down in the Act. For this purpose a Committee has been appointed with instructions to go carefully into the matter, and to draw up a short report.

Petrol Control Committee.—The President of the Board of Trade has appointed Mr. Oliver Bury (chairman), Mr. A. E. Bowen, Sir John Hewett, and Mr. P. G. L. Webb to be a Committee to control the supply and distribution of petrol and to consider what measures are necessary, in the national interest. Mr. H. W. Cole, of the Board of Trade, will act as secretary to the Committee, whose offices will be at 29, Abingdon Street, Westminster, S.W. The committee are not prepared to consider individual applications for supplies of petrol.

A New Underground Poster.—The first of four designs by Fred Taylor, which are to treat of the four seasons of the year in a simple decorative manner, has now made its appearance on the Underground Stations. Fortunately the weather seems more inclined to justify the lines from Robert Bridges, anent the radiant spring, which appear on a scroll across the poster. The only words of direct advertisement appear in two panels in the border, which read: "Travel and see it for yourself by 'General,'" and "Travel and see it for yourself by 'Underground.'"

Electrical Trades After the War.—The Board of Trade have appointed the following committee to consider the position of the electrical trades after the war, with reference to international competition, and to report what steps, if any, are necessary or desirable in order to safeguard the position:—Hon. Sir C. A. Parsons (Chairman), Mr. J. Annan Bryce, M.P., Mr. T. O. Callender, Mr. James Devonshire, Mr. B. M. Drake, Sir John Snell. Communications should be addressed to The Secretary, Electrical Trades Committee, at 7, Whitehall Gardens, S.W.

Half Fares for School Children.—Mr. N. J. Young, general manager of Newport Tramways, has prepared a report showing that in many large towns school children under 15 or 16 are allowed to travel at half price at any time. While he does not consider that such a change could be adopted locally, he suggested that a three months' trial should be given to a system of half fares, at three periods of the day, children from 12 to 15 to be provided with certificates of age for production to the conductor, when required. The Council have adopted the scheme for a six months' trial.

Sheffield Motormen's Exemption Appeals.—Sir W. Clegg, chairman of the Tramways Committee, is president of Sheffield Military Tribunal. Appeals for exemption were lodged by the manager of the tramways for five single drivers and an electrician's apprentice, all unattested men. The manager mentioned that a large number of drivers were married and attested, and appeals for exemption would be made for them on the ground of public service. The Tribunal refused exemption to the five single men. Two claims made by drivers on conscientious grounds were also refused.

Lighting Restrictions in Wales.—On April 17 the Home Office Lighting Restrictions Order for Monmouthshire, Cardiff, Barry, and Penarth came into operation. In Cardiff only about 100 gas and electric street lamps were lighted, and the restriction will cost the Corporation electricity department £20,000. As regards eighteen of the younger men who are being discharged from the department owing to less work requiring to be done, Mr. A. Ellis, the tramways manager and electrical engineer, offered to train as motormen any men who were ineligible for military service.

Avoiding Payment of Fares.—Inspectors and also plain clothes officials are keeping a look-out for passengers who neglect to pay ares on the Newcastle cars. Several cases were recently brought before the magistrates, when the deputy town clerk stated that the practice was very common, and had necessitated a special notice being placed in the cars to the effect that a passenger shall upon demand or before leaving a car pay the fare. The department desired to correct the prevailing opinion that anyone who left without a demand being made for the fare could snap his fingers at the authorities.

City of London Coroner and Accident Prevention.—In his annual report for 1915, Dr. Waldo, the Coroner for the City of London and Southwark, states that he held inquests on sixty-three traffic fatalities, the highest number since the introduction of motors. The increase synchronises with the darkening of the streets dating from October, 1914, and he advises the adoption of the following preventative measures: 1. More street refuges—including such in broad streets along which tramcars run. 2. More police, stationed especially at traffic crossing points. 3. More lifeguards or fenders—at least in the shape of sideguards for hind wheels—for all heavy motors.

Power to Control Omnibus Routes.—On the motion of the Earl of Northbrook the House of Lords on April 18 included in the Local Government (Emergency Provisions) Bill a clause to make it unlawful for any omnibus or other similar carriage plying for hire to use any route that has not been regularly used within twelve months prior to March 12, 1916, except with the consent of the highway authority liable for the maintenance of the roadway. If consent is unreasonably refused, the Local Government Board may be applied to for sanction. The clause contains provisions to meet the case of a temporary diversion of traffic, and as to routes that may be considered necessary for conveying persons engaged in Government work.

Tramway Accidents Increase in Germany.—Owing to the large increase in the number of tramway accidents, the municipal authorities in Germany have appealed for the release of such motormen and conductors as are merely performing garrison duty, in order that they may return to their work on the cars. In the period between the beginning of the war in August, 1914, and December 8, 1915, there were 425 collisions between tramcars, 120 being in the period from August 1 to December 31, 1914, and 305 between January 1 and December 8, 1915. From August to December, 1913, there were only six collisions. The great increase is attributed chiefly to the employment of unskilled men as motormen and conductors.

Supply of Tickets.—The Tramways and Light Railways Association recently made application to the Royal Commission on Paper that licences be granted to paper manufacturers so as to ensure to tramways and other bodies the full amount of their normal requirements in tickets. A reply has been received from the Commission stating that they are unable to licence a greater import on account of tramway tickets than two-thirds of the quantity of pulp imported in 1914. They add that they can see no special call for discrimination, and that there are obvious methods of economising in the production of such tickets. The Council of the Association have appointed a committee to deal with the matter further, and in the meantime the Council recommend that wherever possible the size of tickets should be reduced.

Reckless Driving and Exceeding Speed Limit.—In replying to a Parliamentary question by Sir G. Toulmin, Mr. H. Samuel (Home Secretary), has given the following figures showing the number of prosecutions for reckless driving and exceeding the speed limit in the metropolitan area for the six months ended February last.

	Reckless driving.	Exceeding speed limit.	Total.
1915.			
September	51	356	407
October	63	518	581
November	99	612	711
December	99	379	478
1916.			
January	154	419	573
February	249	912	1,161

Belfast Tramwaymen and Military Service.—The following return has been presented to the Tramways Committee, showing the status of the 297 motormen and 298 conductors with regard to military age, etc. Of those totals 227 motormen and 182 conductors were in the service before the declaration of war, and 70 motormen and 116 conductors have joined since the declaration of war. The following tables show how the men stand with regard to their obligation or otherwise to join the fighting forces of the kingdom:—(a)—Men who were in the service before the declaration of war—(1) Over military age, 130 motormen, 67 conductors; (2) military age (married), 65, 33; (3) military age (unmarried), 32, 38. (b)—Men who have joined the service since the declaration of war—Over military age, 21 motormen, 8 conductors; discharged soldiers, 16, 17; medically unfit (certificates signed by military medical officer), 9, 28; military age (married), 18, 7; military age (unmarried), 8, 4; under military age, 0, 52.

Digitized by Google

Workmen's Tickets.—In reply to Grimsby Highways Committee's request for an extension of the hours for the issue of workmen's tickets, Mr. H. L. White, manager and engineer, has written stating that of 87 municipal tramways, 11 undertakings did not issue workmen's tickets. Of the remaining 76, cheap tickets were issued by 32 up to 7.30 a.m., by 34 issued up to 8 o'clock, and by only 10 after 8 o'clock and up to 9 o'clock. Only 10 issued workmen's tickets later than the Grimsby company, and only 12 granted facilities for the use of low rate tickets during the dinner hour the same as in Grimsby. All tramway stores had increased in price from 25 to 75 per cent., wages had had to be increased, and war bonuses granted. Gross receipts had fallen, and the rate of working expenses had gone up considerably. The company could not possibly extend the time of issue from eight to nine o'clock, as was done in the case of women workers in January, 1914.—West Hartlepool Council have agreed that women generally engaged in manual labour shall be treated as workmen in the matter of fares.

A London Through Running Problem.—An interesting problem relative to through running on the London County Council and the Metropolitan Electric Tramways was mentioned in a letter sent to the Harringay Burgesses' Association by Councillor F. G. Andrews, the representative of the district on the Middlesex County Council. The writer observed that some criticisms had recently been offered with regard to delays and irregular running of tramcars, and efforts made to attach the responsibility. The truth of the matter was that it was one of the results of through running. However carefully the cars on the different routes were arranged so that the connections were properly maintained, with an even proportion of cars, the whole system could be (and was sometimes three or four times a day) completely disorganised by the breaking down of a vehicle on the lines, and the holding up of perhaps thirty or forty cars. Efforts had been made to meet the difficulty by turning some of the cars, but as this conflicted with the terms of the through-running agreement between the Middlesex and London Councils (the latter demanding that their cars must cover their full mileage), it could only be done with the Middlesex cars, and here again there was trouble, because passengers objected to being turned out before they arrived at their destinations. The only perfect method of securing regularity was to prohibit ordinary traffic from using the lines, but this, of course, was at present impossible.

Electric Vehicle Committee.—At the April meeting of the Electric Vehicle Committee, Mr. R. A. Chattock presiding, it was announced that all the associations, with the exception of the Tramway and Light Railways Association, whose reply had not been received had re-nominated their representatives on the Committee. The Committee re-elected the representatives of the following:—Provincial Electric Supply Companies, Makers of Electric Vehicles, Edison Accumulators Ltd., and Chelsea Electricity Supply Co. It was decided to invite the Motor Manufacturers and Traders' Society to nominate a representative. The officers were re-elected for the present year, except in the case of Mr. A. H. Seabrook, who, by reason of the work he is engaged upon in connection with munitions supply, is unable to devote any time to the work connected with the honorary editorship of the "Journal." This work the hon. secretary is undertaking until some one can be found who will accept the position. It was decided that, in future, dimensions for standards will be given in both metric and British measures, and that, in regard to the British measures, exact dimensions will be quoted in mills, while ordinary dimensions will be quoted in fractions. The secretary was instructed to bring this rule to bear in quoting dimensions of standards in the annual report. Mr. E. W. Curtis, of the General Vehicle Co., was nominated as the Committee's Representative upon the Tyre and Road Wear Research Committee of the Society of Motor Manufacturers and Traders. The next meeting was fixed for June 16.

PERSONAL.

Mr. W. H. Beable, vice-chairman of the Sales Managers' Association, is visiting Russia as the representative of various firms to open up new trade avenues.

Mr. J. F. Cameron, general manager and electrical engineer, Northampton Corporation Tramways, stepped into a six-feet deep inspection pit in the darkness while supervising repair work at the generating station last week. He sustained fractures of two ribs.

Mr. F. Schofield, manager of Leyton Council Tramways, having had to undertake additional duties consequent upon the Council deciding not to insure against third party risks, the Tramways Committee recommend that his salary be increased from £400 to £425, to be followed by annual increments of £25 until it reaches £500.

Mr. Clifford C. Paterson, M.I.E.E., A.M.I.C.E., principal assistant in charge of Electro-technical and Photometric Buildings at the National Physical Laboratory, has arranged to join the Osram-Robertson Lamp Works, Ltd., as Director of Laboratories for Research and Technical Manufacturing purposes. The arrangement will commence at the conclusion of the war, or before that date, if possible.

Mr. Percy Priestley, general manager and engineer, Mexborough and Swinton Tramways Company, has been selected by Oldham Tramways Committee for appointment by the Council as general manager of the tramways undertaking, at an initial salary of £400. The directors of the company will regret the departure of Mr. Priestley, who has had charge of their undertaking since 1907. He was formerly assistant manager of Halifax Corporation electricity undertaking, and is 41 years of age.

Mr. E. Powell has been unanimously re-elected President of the Society of Motor Manufacturers and Traders. In the Report of proceedings for the year 1915 presented to the new Council, it was pointed out that in spite of the absence of exhibitions, trials, competitions, etc., there had been a number of meetings beyond the average. Some of these were special meetings, dealing with subjects to which the President had given personal attention, and as similar matters were likely to continue to require attention on behalf of the industry generally, the unanimous desire was expressed that Mr. Powell should consent to retain office, which, in the circumstances, he agreed to do. The new Vice-Presidents are Mr. A. Brown and Mr. E. Hopwood.

Sergeant W. R. Smethurst, Royal Sussex Regiment, a motorman on the Salford Tramways, was, on April 18, presented with the Distinguished Conduct Medal for gallantry on September 25 last at Le Rutoire (Loos). During that engagement the officers of his company had been put out of action, but the sergeant took command, although he had been seriously wounded. By his bravery and example he materially assisted in the attack. The presentation was made at a meeting of the Tramways Committee by Alderman Worsley, the Deputy Mayor. On behalf of the Tramways Committee, Alderman Linsley, the chairman, handed the sergeant an illuminated copy of a resolution passed by the Committee, congratulating him upon the distinction he had won. In reply Sergeant Smethurst, who before the war was a reservist, stated that his period of service had now expired, but he was not going to claim his discharge.

Alderman J. H. Aston, of Huddersfield, died on April 13. He was for nine years chairman of the Tramways Committee, and he retired in November last on account of ill-health. The Committee at that time placed on record their high appreciation of his services.

Mr. G. Proudman, who has died at Birkenhead, was a former chairman of the Tramways Committee of that borough. He had been in the service of the London and North-Western Railway Company for forty-five years at Broad Street Station, London, and at Birkenhead.

CONTRACTS AND ORDERS.

Wolverhampton Electricity Committee have recommended acceptance of the following tenders:—Brush Electrical Engineering Company, two 300 kw. transformers; Reyrolle and Co., switchgear; Stirling Boiler Co., two boilers, two superheaters, and two sets of mechanical stokers.

Aberdare Council have placed the following contracts for a year's supply of stores to the electricity and tramways department:—Uniforms, Hobson & Sons, London; cables, Callender's Cable and Construction Co., Ltd., London, E.C.; meters, British Westinghouse Electric and Manufacturing Co., Ltd.; joint boxes, Sykes & Sugden, Ltd.; lubricating and other oils, Vacuum Oil Co., Ltd.

Dover Tramways Committee offered the contractors for the supply of tickets an increase of 5 per cent. instead of 10 per cent., as requested. Although the company pointed out that the war had invalidated existing contracts, the Committee have decided to adhere to their previous offer. The Municipal Tramways Association wrote that the Paper Commission stated that there should be no difficulty in obtaining an adequate supply of tickets.

Johannesburg Council have been recommended by the Tramways and Lighting Committee to accept the appended tenders:—Two 3,000 kw. turbo-alternator sets, with Parsons condensing plant, switchgear, and cable connections, erected compete, including excavations and foundations, Sykes & Co., £26,395; spare rotor, Sykes & Co., £798; wet air filtration plant, of capacity not less than 36,000 cubic feet of air per minute, Griffin Engineering Co., £690.

FINANCIAL REPORTS AND MEETINGS.

Willans and Robinson, Limited.—The directors announce a dividend of 10 per cent. on the ordinary shares for the past year, carrying forward £8,776.

La Plata Electric Tramways.—The accounts for 1915, including £6,614 brought in and after providing for debenture stock and other interest, show a credit balance of £12,142, which the directors recommend be carried forward.

New Record at Glasgow.—For the first time the tramways department's revenue reached a million sterling on April 18, on which date the number of passengers had increased by twenty-four millions. May 31 is the end of the financial year.

A Rate in Aid for Heywood.—Last year's working of the Corporation Tramways resulted in a loss of £518, as against a loss of £1,042 the previous year. The Electricity and Tramways Committee, have decided to ask for a rate of 4*d.* towards the deficiency on the electricity department, and 1*d.* for the tramways department.

Improved Outlook at Oldham.—Alderman Isherwood, chairman of the Tramways Committee, has announced that the past year's working shows a profit of £3,886, subject to audit, besides which the undertaking had paid £5,225 as war allowances, and £1,000 for the Hollinwood extension. The three motor omnibuses revealed a loss of £720, including a payment of £494 to the sinking fund.

Calcutta Tramways Company.—The net profits for 1915, including £7,566 brought forward, were £116,736. A final dividend of 6*s.* 6*d.* per share is proposed, making 9½ per cent. for the year, transferring to reserve for depreciation, etc., £15,000, and to staff provident fund £1,309, carrying forward £6,812. The reserve at the commencement of the year stood at £80,550. After deducting therefrom £14,066 written off for renewals, and adding £15,000 proposed to be allocated, it will stand at £81,484.

Digitized by Google

Penny Universal Fare at South Shields.—Alderman W. G. Wylie, chairman of South Shields Tramways Committee, has reported that the tramways have now been ten years in existence. The first year's receipts were £24,000, while for the year ended March 31 last the revenue was £42,942, an increase of £1,900 as compared with the previous year. The undertaking had proved a great municipal success. The amount given in relief of the rates last year was £2,400, which was equal to more than a penny rate. We may add that early in 1913-14 the Corporation, as the result of a report presented by Mr. W. T. Robson (who last year became general manager at Southampton) introduced the penny universal fare.

Record Results at Leeds.—Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways, has presented to the Tramways Committee a draft statement of the receipts and expenditure for the year ended March 31 last. After the Committee had considered the statement, the Chairman (Alderman R. A. Smithson) expressed satisfaction with the result of the year's working, and, on behalf of the Committee, complimented the general manager and his staff upon their labours. We append a comparison from the financial statements of the past three years :—

INCOME :—	1916.	1915.	1914.
	£	£	£
Traffic revenue ..	467,197	429,902	423,516
Advertising	2,620	3,915	3,822
Mineral haulage ..	634	—	—
Rents	5,054	693	117
Total	£475,505	£434,510	£427,455
EXPENSES :—			
Traffic	114,724	115,601	113,819
General	41,190	40,347	41,144
Repairs and maintenance	42,786	43,609	41,020
Power expenses ..	16,837	14,035	24,345
Energy purchased ..	15,178	14,542	6,054
War bonus to employees	5,512	—	—
Total	£236,227	£228,134	£226,382
Net revenue	239,278	206,376	201,073
Bank Interest	4,443	1,343	2,674
Dividends on investments	5,867	6,493	5,679
Total	£249,588	£214,213	£209,427
Interest	3,818	3,818	2,784
Interest on capital ..	49,474	44,527	42,176
Income tax	15,349	7,356	5,343
Rent of lines	3,071	3,125	3,223
War allowances ..	13,270	4,460	—
Balance to appropriation fund ..	£165,204	£151,526	£155,898
APPROPRIATIONS :—			
Redemption fund ..	72,488	57,572	53,914
Cost of Acts	703	258	403
Renewal of permanent way	3,146	7,771	31,576
Renewal of rotary converter	—	4,156	—
Third party risk reserve	2,044	—	—
Reserve fund	15,000	—	—
Net surplus	71,821	81,567	70,004

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended April 15, the latest period for which full returns are available, give total receipts of £179,499, or £11,455 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £75 19s. 10d. per mile of single track, and last year at the rate of £73 7s., thus showing an increase for the week of £2 12s. 10d. per mile open.

DICK, KERR & Co.,

Limited,

ABCHURCH YARD, CANNON STREET, LONDON, E.C.

ENGINEERS & CONTRACTORS.

Complete Equipment

TRAMWAYS & LIGHT RAILWAYS

at home and abroad.

MANCHESTER CORPORATION TRAMWAYS.

Alderman J. Bowes presided over a meeting of Manchester Tramway Committee on April 18 at which the general manager (Mr. J. M. McElroy) submitted the estimates of receipts and expenditure for the year 1916-17. The estimated receipts are £950,365 (including the transfer of £10,865 from the reserve fund to meet extraordinary expenditure), as against an approximate income of £939,416 for the past year. The estimated expenditure for the current year is £950,365. The Committee agreed to contribute £100,000 in relief of the rates, as on two previous occasions, but to do this they will have to take £10,865 from the reserve fund. This rate contribution was fixed by the Council three years ago, and before another year passes a fresh arrangement will be proposed by the Committee, who regard the position of affairs as very serious, owing to the large payments in respect of war service allowances. The general manager submitted the following statement in connection with the estimates :—

	1914.	1915.	1916.
Total revenue	£925,310	£901,876	£939,416
Car miles run	19,463,646	19,155,051	18,486,440
Revenue per car mile..	11.41*d.*	11.3*d.*	12.196*d.*
Passengers carried ..	205,608,741	202,768,420	209,853,344

Last year's revenue was higher than that of the year 1914, which was a record year. The earnings per car mile were 12.196*d.*, which is a much higher figure than in any previous year.

During the year, although the number of passengers carried was greater, the ordinary working expenses of the department were considerably less than either of the two preceding years, as will be seen by the following table :—

	1914.	1915.	1916.
	£	£	£
Traffic expenses ..	276,663	273,002	261,968
General expenses ..	89,420	85,809	88,484
Repairs and maintenance	89,649	85,280	81,594
Power expenses ..	129,492	128,350	130,390
	£585,224	£572,411	£562,436

The increase under the head of general expenses for the past year as compared with the previous year is due to an increase in the amounts paid in local rates. During the past three years the local rates paid to the city and the various out-districts were as follow, viz. :—1914, £45,154 ; 1915, £45,794 ; 1916, £49,507.

The increase in the power expenses for the past year is due to the greater price paid for electrical energy owing to the higher cost of coal. The prices per unit charged by the Electricity Department for the last three years were as follow, viz. :—1914, 1.026*d.* ; 1915, 1.023*d.* ; 1916, 1.085*d.* (estimated).

If we had paid the same price per unit last year as we did in 1914 the total of the power expenses would have been £123,474 instead of £130,390.

The estimates for the current year are based upon an estimated car mileage of 18,500,000. They show that after making provision for the payment of £100,000 to the city fund, and meeting the extraordinary expenditure arising out of the war (viz., £94,000 for war service allowances, etc., and £40,000 income tax), we shall not only be unable to make any provision for renewals, but it is estimated that there will be an actual deficiency in the revenue of £10,865, which it is proposed to meet by a transfer from the reserve and renewals fund.

As the note at the foot of the printed copy of the estimates shows, the item of £40,000 for income tax may be considerably reduced if the Trading Committees succeed in convincing the Arbitrator that their view of this matter is the correct one. In this event we shall not only be able to avoid having to make the transfer from the reserve fund to meet the estimated deficiency, but we shall be able to pay to the credit of such fund a sum of about £10,000.

The large payments in respect of war service allowances are (as I have pointed out on previous occasions) a very serious drain on the financial resources of the department. The following are the figures for the past two years and the estimated figure for the current year :—Year ended March 31, 1915, £31,764 ; 1916, £92,881 ; 1917 (estimated), £94,000 ; total for three years, £218,645.

We have only been able to meet the payments in respect of war service allowances by transferring less sums each year to the reserve and renewals fund than we should have done had the times been normal. The following figures show the decreased provision made for renewals, viz. :—Year ended March 31, 1915—Normal provision for renewals, £97,198 ; amount actually provided, £48,584. Year ended March 31, 1916—£98,950 and £20,092 ; Year ended March 31, 1917—Normal provision for renewals, £99,450 ; amount estimated to be provided, nil ; decreased provision during the three years, £226,922. The amount standing to the credit of the reserve and renewals fund at March 31, 1916, was £412,464 The proportion of this which has been invested in statutory securities is £348,419. The balance, which is used as working capital, is £64,045. The shrinkage in the value of the amount invested is estimated to be at least £67,000, or nearly 20 per cent. It should be noted, however, that in calculating this figure it has, in most cases, been necessary to take the minimum prices fixed by the Government. As it is very doubtful that the securities could be actually realised at these prices to-day the shrinkage in value is probably much greater than the amount estimated. Since the commencement of the undertaking in 1902 the sum of £1,050,146 had been paid to the credit of the renewals fund, and the withdrawals therefrom to meet the expenditure incurred in the renewal of the plant, etc., totalled £637,682. The capital outlay has been £2,216,009, and the sum of £672,028 has been set aside for debt redemption.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. Apr. 27.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	69	68½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	72/6	71½
4%	4%	Do. 4% Deb. ...	100	91	74	73¾
4½%	4½%	Do. 4½% Deb. ...	100	98½	73½	73
5%	5%	Do. 5% Deb. ...	100	96	78	78¼
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92½	92½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$½	$1	Brazilian Trac. & Power Ord. ...	$100	66	56¼xd	55¾
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92½	91 31/32
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	89/4½	88/9
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	39¾	39¼
5%	5%	Do. 5% Cu n. Pref.	100	103	54¾	52½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	85½xd	85½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	62¾	62¾
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	71	71
70/-	70/-*	Do. 7% Pref.	100	55¾	47⅞	45½
—	—	Do. 6% Pref. Ord.	100	17½	17⅛	16½
—	—	Do. Def. Ord.	100	11	10¼	9⅜
5%	5%	Do. 5% Deb.	100	92	79	78½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70¼	70¼
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	89
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6 11/32	6 11/32
1/3	1/3	City of B.A. Trams.	5	5½	92/3	92/6
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11⅜	11⅜
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	1/9	1/9
5/6	6/-	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	8/6	7/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89¾	89¾
5%	5%	Do. 5% Inc. Deb.	100	88½	78¼	78½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	49½	49½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/6	98/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70	68
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78¾	78¾
$1¾	$1¾	Mexico Trams. Common ...	$100	70	25	22⅝
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40	40¾
6%	6%	Do. 6% Mt. Bds.	100	76	34¼	34¼
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	92¼	94¼
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94⅝	95
1/2*	1/2¾*	National Steam Car	1	15/32	14/-	13/-
9⅜d.*	9⅜d.*	New General Traction	1	¼	7/9	7/9
6d.	8⅜d.	Northern Gen. Trans. Ord. ...	1	29/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	55/-	53/5
5%	5%	Do. 5% 1st Deb.	100	89½	75	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	15/32	10/7½	10/6
8d.	10d.	Provincial Trams. Ord.	1	¾	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	89¾	90¼
5%	5%	1st. Mt. 5% 50 yr.	100	89½	73¾	74¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88¼	88
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	78
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	99½	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	86xd	88¾
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	91	94
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	74	74
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	1915-16	Aggregate. Wks.	1915-16	Increase or Dec.
Anglo-Argentine	Apr. 22	£53,329	£47,697	17	£813,468	— £2,933
Auckland (28 days)	Mar. 10	19,907	20,711	36	189,937	+ 3,002
Ballarat and Bendigo	Feb. 27	3,469	3,512	48	39,843	— 2,718
Brazilian Traction Mlrs.	Feb.	5,797,500	6,079,000	9	12,509,000	+ 715,310
Brisbane	Mar.	30,740	34,275	13	96,875	+ 9,925
British Columbia $	Feb.	558,512	572,935	35	4,405,030	— 792,876
Buenos Aires Lacroze	Mar.	44,332	42,219	39	372,882	— 6,594
Burmah Tramway Rs.	Apr. 22	3,758	3,456	38	...	+ 7,321
Calcutta Rs.	,, 22	62,452	64,524	17	1,089,330	+ 67,441
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias	Mar.	2,436	2,991	13	7,417	+ 2,255
Cordoba	Feb.	11,534	11,831	48	148,308	+ 5,399
East India	Mar.	1,846	2,196	35	16,590	+ 1,214
Hong Kong $	Mar. 25	9,776	11,502	15	160,942	+ 19,037
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Mar.	34,185	34,159	13	101,073	+ 3,681
Lisbon Escu.	Feb.	...	163,012	9	346,894	...
Madras (2 weeks) Rs.	Apr. 16	28,604	30,818	15	219,109	+ 21,418
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Mexico $	*	...	...	...	...	...
Montevideo	Mar.	29,716	31,956	21	158,422	+ 10,553
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway $	*	...		...	...	...
Rangoon	Jan.	4,689	4,763	4	4,763	+ 74
Shanghai $	Mar. 22	24,663	26,041	...	...	...
Singapore $	Mar. 18	10,835	11,959	11	134,351	+ 17,621
Toronto $	Feb.	767,326	846,256	9	1,752,606	+ 141,929
Winnipeg	Feb.	314,658	293,250	9	590,810	— 74,530

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Aggregate. Wks.	1916	Incr. or Dec.
Aberdare	Apr. 11	£324	£363	+ £39	2	£595	— £103
Aberdeen Corporation	,, 19	1,602	1,688	+ 86	46	81,883	+ 5,103
Accrington Corp.	Feb. 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	Apr. 22	280	313	+ 33	50	17,123	+ 1,071
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 23	1,231	1,459	+ 228	3½	4,706	+ 145
Birmingham Corp.	,, 22	12,445	15,461	+ 3,016	3	50,639	+ 6,214
Do. Motor Omnibuses	,, 22	685	767	+ 82	3	2,578	+ 58
Blackburn Corp.	,, 19	1,167	1,060	— 107	3⅞	3,930	— 721
Blackpool & Fleetwood.	,, 22	338	754	+ 416	16	5,479	— 201
Blackpool Corp.	,, 20	667	872	+ 205	3	2,817	— 944
Bolton Corporation	,, 23	2,516	3,441	+ 925	4	9,844	+ 116
Bournemouth Corp.	,, 26	2,048	3,006	+ 958	4	8,581	— 441
Bradford Corporation	,, 15	6,475	6,329	— 146	2	11,331	— 2,589
Brighton Corporation	,, 23	901	1,241	+ 340	3⅞	3,447	— 103
Bristol	,, 21	8,957	9,305	+ 348	16	146,564	+ 7,339
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	,, 22	1,465	2,113	+ 648	4	6,951	+ 513
Burton-on-Trent Corp.	,, 15	267	240	— 27	2	530	— 128
Bury Corporation	,, 23	1,242	1,730	+ 488	3⅞	4,897	— 102
Cardiff Corporation	Mar. 25	1,554	2,614	+ 1,060	51	138,838	+ 1,370
Chatham & District	Apr. 13	1,081	1,139	+ 58	15	15,571	+ 570
Chesterfield Corp.	,, 13	251	259	+ 8	2	502	— 36
Colne Corporation	,, 22	225	368	+ 143	...	...	...
Cork Electric	,, 13	481	465	— 16	15	6,663	+ 15
Croydon Corporation	,, 7	550	1,796	+ 1,246	1	1,796	+ 1,246
Derby Corporation	,, 22	945	1,139	+ 194	3½	3,488	— 125
Dover Corporation	,, 22	269	305	+ 36	3	913	— 87
Dublin & Lucan	,, 21	139	135	— 4	16	1,859	— 164
Dublin United	,, 14	6,326	5,989	— 337	15	87,417	+ 3,402
Dundee City	,, 19	1,289	1,262	— 27	48⅞	65,557	+ 3,621
East Ham Corporation	,, 22	1,309	1,271	— 38	3½	3,934	— 264
Exeter Corporation	Mar. 31	304	319	— 15	52	19,123	+ 1,159
Glasgow Corporation	Apr. 22	21,560	22,422	+ 862	47	1,019,880	+ 74,680
Glasgow Subway	,, 22	1,106	1,222	+ 116	16	19,978	+ 2,470
Glossop (U. Elec. Supp.)	,, 22	115	150	+ 35	17	2,195	+ 322
Halifax Corporation	,, 18	1,984	1,915	— 69	2⅞	5,329	— 1,197
Do. Motor Omnibuses	,, 18	42	36	— 6	2⅞	103	— 46
Hastings & District	,, 21	932	911	— 21	16	11,818	— 425
Huddersfield Corp.	,, 15	2,387	2,664	+ 276	2	5,443	— 330
Hull Corporation	,, 22	2,981	3,169	+ 188	3	9,687	— 1,038
Ilford U.D.C.	,, 22	606	659	+ 53	3	2,085	+ 98
Ilkeston Corporation	,, 26	111	158	+ 47	4	528	+ 48
Ipswich Corporation	,, 22	407	493	+ 86	3	1,454	+ 48
Isle of Thanet	,, 22	339	310	— 29	29	7,336	— 1,409
Kilmarnock Corp.	,, 22	161	170	+ 9	49	8,133	+ 320
Lanarkshire	,, 13	1,833	2,106	+ 273	15	31,593	+ 5,277
Lancashire United	,, 19	1,631	1,608	— 23	16	25,284	+ 783
Leeds City	,, 22	8,254	9,017	+ 763	4	29,498	+ 2,161
Leicester Corporation	,, 22	2,814	3,231	+ 417	16	51,496	+ 6,153
Leith Corporation	,, 22	676	786	+ 110	49	37,700	+ 3,494
Leyton U.D.C.	,, 20	1,594	1,505	— 88	3	4,595	— 478
Liverpool Corporation	,, 15	12,562	13,443	+ 881	15½	199,580	+ 9,326
Llandudno & Colwyn B.	,, 21	326	298	— 28	20½	4,004	— 425
London County Council	Mar. 29	46,463	44,069	— 2,394	51⅞	2,299,705	— 27,382
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	Apr. 22	159	133	— 26	28½	4,828	— 1,134
Maidstone Corporation	,, 13	188	189	+ 1	2	506	— 72
Manchester Corp.	,, 15	16,869	17,670	+ 801	2	39,622	+ 2,138
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	,, 30	69	164	+ 95	52	10,151	+ 852
N'castle-on-Tyne Corp.	,, 15	5,995	5,981	— 14	2	13,157	+ 140
Newport (Mon.) Corp.	,, 22	736	865	+ 129	3	2,806	+ 782
New St. Helens & Dist.	,, 19	950	854	— 96	42	41,485	+ 2,910
Northampton Corp.	,, 21	626	656	+ 30	3	1,840	— 383
Nottingham Corp.	,, 20	3,363	3,738	+ 375	3	10,737	— 438
Oldham Corporation	,, 23	2,122	2,760	+ 638	4	10,421	+ 283
Portsmouth Corp.	,, 22	2,408	2,515	+ 107	4	7,914	...
Preston Corporation	,, 19	896	1,005	+ 109	2⅞	2,718	— 71
Provincial	,, 22	2,085	2,318	+ 233	29	60,086	+ 3,397
Reading Corporation	,, 13	722	757	+ 35	1⅞	1,438	— 8
Rhondda Tramways	,, 6	1,513	1,242	— 271	14	16,028	+ 530
Rochdale Corporation	,, 22	1,539	2,210	+ 671	3½	6,082	+ 88
Rotherham Corp.	,, 26	978	1,697	+ 719	3⅞	5,342	+ 1,371
Salford Corporation	,, 24	4,959	5,665	+ 706	3⅞	18,472	+ 903
Sheffield Corporation	,, 23	8,034	10,004	+ 1,970	4	40,408	+ 5,968
Southampton Corp.	,, 19	1,362	1,391	+ 29	2⅞	3,900	— 236
Southend-on-Sea Corp.	,, 19	748	639	— 109	3	1,765	— 337
South Met. Trys.	*]	...	...	...	...	...	...
South Shields Corp.	,, 15	691	754	+ 63	2½	1,638	— 50
Sunderland Corp.	,, 23	1,351	1,578	+ 277	3	5,143	+ 17
Sunderland District	,, 19	569	576	+ 7	25	14,080	+ 828
Swindon Corporation	,, 19	174	169	— 5	2⅞	482	— 24
Torquay Tramways	,, 13	587	495	— 92	15	6,241	— 277
Tyneside Trys. & Tmrds.	,, 19	547	515	— 32	16	7,888	— 344
Wallasey Corporation	,, 22	1,124	1,295	+ 171	3½	3,910	— 230
Walsall Corporation	,, 22	653	788	+ 135	17	12,522	+ 1,570
Walthamstow U.D.C.	,, 22	816	975	+ 59	3	3,088	+ 318
Warrington Corp.	Mar. 23	426	462	+ 36	51	23,882	+ 1,728
West Ham Corporation	Apr. 20	3,012	3,148	+ 136	2⅞	8,937	+ 84
Wigan Corporation	,, 13	1,407	1,574	+ 167	2	2,948	— 369
Wolverhampton Corp.	,, 26	983	1,582	+ 599	4	4,696	+ 671
Yorkshire (W. Riding)	,, 23	1,796	1,764	— 32	17	27,122	+ 2,126

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON. Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS

COAN CASTS CLEAN CRANK CASES

MADE AND REPAIRED.

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 23.] LONDON, SATURDAY, MAY 6, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF MANCHESTER.

COAL-HANDLING PLANT.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery and erection of Automatic Coal Handling Plant at Stuart Street Station.

Specification, drawing and form of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of one guinea, which amount will be refunded on receipt of a bona-fide tender.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed, and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. on Wednesday, May 17, 1916.

The firm entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
May 2, 1916

ELECTRIC GENERATING PLANT FOR SALE.

The Metropolitan Railway Company have for disposal the electric generating plant as described below, which has until recently been employed in supplying current to the Great Northern and City Railway.

The plant consists of :—

Four 575-volt D.C. 800 kw. Generators with cross compound Corliss Engines.
Ten Davey-Paxman Boilers.
Four Wheeler Condensing Plants.
Auxiliary Engine and Generator.
Coal-handling Plant.
Feed Pumps, Economisers, etc.

Detailed particulars can be obtained by application to the

GENERAL MANAGER.

Metropolitan Railway Company,
Baker Street Station, N.W.

RAILS WANTED.

Wanted—About 20-30 tons Rails. B.S.S. No. 2 or 2C.

J. F. SIMPSON,
Engineer and Manager.

Corporation Tramways,
Deepdale, Preston.

POSITIONS VACANT.

BOROUGH OF GILLINGHAM, KENT.

ELECTRICITY DEPARTMENT.

The Council of the above Borough are prepared to consider applications for the following vacancies. Candidates must be able to produce proof that they are ineligible for service in any capacity in H.M. Forces.

(*a*) Assistant Engineer, must be accustomed to the routine work of an H.T. Multiphase System and be competent to supervise the running and repair of Willans steam and Diesel engines and B. & W. boilers. Will be required to take charge of the running of the plant on day shift. Salary £150 per annum. Engagement for the period of the war.

(*b*) Jointer. Must be accustomed to joining on H.T. and L.T. lead-covered paper-insulated multicore cables, and able to do own plumbing. Wages £2 per week of 48 hours, plus 1s. war bonus. Engagement permanent.

Applications for above, endorsed either "A" or "B," stating age, and giving full particulars of previous experience, together with copies of three testimonials, to be addressed to the Borough Electrical Engineer, Generating Station, Gillingham Road, Gillingham, Kent, and delivered not later than noon on Friday, 12th inst.

Canvassing directly or indirectly will disqualify.

(By order) F. C. BOUCHER,
Town Clerk.

Corporation Offices,
Gardiner Street,
Gillingham, Kent.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY DEPARTMENT.

Junior Engineers in-Charge are urgently required. Must have been employed at least two years in a works of not less than 2,000 kw. capacity. Experience in running of steam plant essential. Wages to commence £2 5s. per week. Applications in candidates' own handwriting, stating age and if attested, together with three references, to be sent in at once to the undersigned.

A. NICHOLS MOORE,
Borough Electrical and Tramways Engineer.

Town Hall, Newport, Mon.
May 3, 1916.

SWITCHBOARD ATTENDANT.

Switchboard Attendant wanted for 3-wire D.C. Station, to take charge of plant. Experience with Diesel engines preferred. Must be ineligible. Apply, stating age, experience, and salary, Electricity Works, Alderley Edge.

SHIFT ENGINEER.

Shift Engineer wanted. Commencing salary 31s. 6d. per week. Apply, stating age, experience, and copies of testimonials, to Chief Engineer, Electricity Works, Canterbury.

FOREMAN PLATELAYER.

Wanted, Working Foreman Platelayer, permanent job. Apply, giving particulars of experience and wages required. Engineer and Manager, Rhondda Tramways Company, Ltd., Porth, Glam.

SWITCHBOARD ATTENDANT.

Switchboard Attendant of non-military age required. Wages 7½d. per hour per week of 56 hours.—Send full particulars and testimonials to Engineer, Corporation Tramways, Portsmouth.

Digitized by Google

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 3488 Leeds. MATERIAL AND SUPPLIES.

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.
Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World
Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MAY 6, 1916.

THE DAYLIGHT SAVING BILL AT LAST.

All who are connected with the transport industry and the production of electrical energy will welcome the announcement that on Monday next the Government are to afford an opportunity to the House of Commons to adopt the motion in favour of daylight saving introduced by Sir Henry Norman. That it has taken a world-wide war and the acceptance of the reform this year by Germany, Austria, and Holland, to awaken the country to the great gain to be derived from putting the hands of the clock forward for an hour from May to September affords another instance of the lack of regard for the national welfare. The heedlessness of the British character is too common, and one of its effects is to produce the policy of drift that has enabled other nations to secure much of our foreign trade. Royal Commissions, Select Committees, and resolutions by central organisations we have in abundance, but their recommendations are quietly shelved. The same result occurred in the case of the Daylight Saving Bill, which was introduced as the result of the late Mr. Willett's efforts in 1908, and was referred to a Select Committee. Judging by the letter from the Home Secretary that has been published this week, the present Government realise the advantages promised by the measure, and as the House comprises many representatives of the interests that supported the Bill before the Select Committee, there ought to be no difficulty in bringing its provisions into immediate effect. In 1908 the chief difficulty that presented itself to railway managers was in regard to Continental time, but the war has solved that, and although France has not yet adopted the change, it has received the approval of the Chamber of Deputies, and now awaits the action of the Senate. Apart from the changed attitude of the Continent and the part that the innovation will play in assisting the production of munitions and improving the health of the workers, there are a number of reasons that render the adoption of the Bill imperative. First the committee of general managers who are administering the railway system of the country have declared in its favour. Then on Thursday last the Board of Trade requested electricity undertakings to bring about a reduction of ten per cent. in their customers' consumption in order to lessen the burden on shipping, railway transport and the mining industry. These are all important reasons, and their attainment will be assisted by the operation of daylight saving. It has been computed that three million tons of coal would be saved annually, and six months before the war the late Mr. Willett produced figures to show that at the rates then current the nation would gain at least two and a half million sterling a year in the outlay on artificial light. The putting forward of the clock for the period stated would give us 154 hours of daylight now spent in sleep. The additional hour of daylight available for recreation in the evening would in time of peace result in increased pleasure traffic by tramway and railway. When the measure was before the Select Committee evidence was given on behalf of the London County Council Tramways department that it would effect a saving of artificial light and an increase of revenue equivalent to £10,000 per annum. The London and South Western Railway computed their saving at £4,500 per annum, and for railways generally the gains were put at £5,000,000. Such estimates from authoritative sources show that the advantages of the measure will be substantial, and in the present conditions the nation cannot afford to neglect them.

FARE REVISION AT NEWCASTLE.

In a report presented by the Tramways Committee to Newcastle Corporation on May 3, it was stated that lately the workmen's cars have been run, if not at a loss, certainly not at a profit, and the revenue that has been obtained, notwithstanding the fact that they have been running at high pressure, is not sufficient to meet the cost of renewals necessary for the successful conduct of the enterprise. The committee made recommendations dealing chiefly with the fares of workmen and of soldiers, by which means they hope to augment the income. The general manager (Mr. E. Hatton) had prepared the appended figures showing the relative working costs of the undertaking at the present time compared with the costs for 1915 and also the period immediately preceding the curtailment of the service on November 6 to meet the urgent demands for the running of more workmen's cars in the morning:—

A	Weekly working expenses for 1915	£3,100	Number of workmen's cars run in morning 96
B	Weekly working expenses during October, 1915 ...	£3,700	Number of workmen's cars run in morning 125
C	Weekly working expenses since November 6, 1915 ...	£4,074	Number of workmen's cars run in morning 180

Recently, owing to lack of labour and facilities to maintain the cars, the number of workmen's cars has dropped to 160 a morning. For the three periods mentioned the gross income and expenses had been:—

	Pence
A—Gross income per passenger	1.081
Gross expenses per passenger	.907
B—Gross income per passenger	1.112
Gross expenses per passenger	.904
C—Gross income per passenger	1.069
Gross expenses per passenger	1.044

The report continued: "No provision has been made in the figures for the amount which should be provided out of any surplus profits for renewals. It will thus be seen that, owing to the heavy increased working costs, the whole of the present income is practically absorbed. For the three periods quoted the traffic expenses were as follow:—

A—3.478*d.* per mile.
B—4.060*d.* per mile.
C—4.495*d.* per mile.

"As these expenses practically consist of wages, the following table shows how largely this item has influenced the increased costs of working:—

	Per Car Mile. A Pence	B Pence	C Pence
Total working expenses	10.023	11.934	12.658
Receipts from workmen's service	10.85	14.380	10.500
Total receipts from whole service	12.187	14.700	12.970

"From these figures it will be seen that the receipts from the workmen's cars now show a loss of 2.158*d.* per car mile. It is evident from the comparison of these figures that increased sources of revenue must be found, and, in view of the loss of 2*d.* per mile on the workmen's traffic, it is essential that a change should be made so that this traffic may pay its working cost."

The workmen travel at half-fare, so that it is almost wholly owing to the fact that this special provision has to be made that the cars are not paying. For example, an ordinary passenger, travelling from Scotswood Bridge to Falconar Street, would pay 2½*d.*, while

Digitized by Google

a workman would pay 1*d*. The same conditions apply to Sundays, morning and afternoon when the cars are brought out, and, although the workmen are being paid double pay at the factory for Sunday work, and the Tramways Committee is paying an equivalent of time and a half for working the cars, the workmen are carried at the same reduced rate.

The Committee proposed "that all workmen shall in future travel by coupon tickets, that no reduced fares shall be allowed on the cars except to those passengers producing coupon tickets, and that twelve coupon tickets entitling a passenger to travel a penny workman's distance shall be sold at 1*s*. 3*d*., instead of 1*s*.; similarly that twelve coupon tickets entitling a passenger to travel a 1½*d*. workman's distance shall be sold at 1*s*. 9*d*. instead of 1*s*. 6*d*.; and that twelve dinner-time coupons enabling a passenger to travel a halfpenny workman's distance shall be sold at 8*d*. instead of 6*d*." It is hoped, by this means, to increase the revenue of the undertaking by £10,000 per annum. All the concessions that have been made, it is pointed out, are for the benefit of the workmen in the factories, while the low-paid men in shops and warehouses have to pay the full fares. At the present time, there are 186,000 workmen being carried per week at special fares.

The Committee state that it is difficult to see to what extent tramway traffic will be affected by the calling up of further drafts of men now in civil employment, and, should the foregoing alterations not produce the necessary increase in revenue, then action will have to be taken in increasing the ordinary fares, but at the present time the Committee feel that it would be premature to proceed with this without greater necessity. They mention that an increase of fares at Birmingham produced an extra revenue of £100,000 for the past year.

Seventy thousand soldiers travel at half-fares in Newcastle every week. For these passengers it was proposed that the half-fare system should be continued, but that the minimum fare should be one penny instead of a halfpenny. For hospital and district nurses in uniform half-fares are to be granted with a minimum of one penny.

Councillor R. Mayne, chairman of the Tramways Committee, in proposing the adoption of the recommendations at the Council's meeting on May 3, said that instead of making 2*d*. per car mile on the workmen's traffic they were making scarcely ½*d*., which was not enough to pay for renewals, to say nothing of any contribution to the rates, which would be badly wanted next year. The undertaking as a whole was remunerative. The Corporation adopted the report with the exception of the paragraphs relating to soldiers and nurses.

QUEUE REGULATIONS FOR BRADFORD.

The Board of Trade have approved of the regulations recently adopted by Bradford Corporation at the instance of the Watch Committee, requiring that when six or more persons are waiting for tramcars they must stand in queue formation in the order of their arrival. Hitherto the Tramways Department have had no power to prevent intending passengers from getting out of their order in the queues that are formed at certain places, but the new regulations give authority to the Department and the police to summons offenders, who are liable to a fine not exceeding forty shillings. Some difficulty in enforcing the regulations will probably be experienced in Forster Square, as the corner opposite the Midland Railway Station is the terminus of six routes, and considerable crushing takes place. A firm administration of the by-law should effect an improvement, which is to be desired in the interest of both the public and the Tramways Department. The existence of barriers there will greatly aid in the carrying out of the reform. Proof of this is to be seen at the Blackfriars covered queue on the Thames Embankment, where the waiting crowds often extend in double ranks to nearly one hundred yards beyond the shelter. For some years orderly loading from queue formation has been enforced at Southwark Bridge, London, where there are several starting places, at each of which a chain barrier is erected during the evening rush period. Three years ago the County Council obtained Parliamentary power to enforce the regulations. At Bradford the regulations apply not only to termini but to all stopping places where six or more persons are waiting.

OMNIBUSES AND ROAD MAINTENANCE.

Recently Sheffield Tramways Department extended their motor omnibus service to Eckington for the convenience of munition workers, although it is stated that the Corporation do not possess powers to run to that locality. The sum of ⅞*d*. per car mile is paid to the County Council for road maintenance, which is equivalent to a sum of £120 per annum, whereas it is estimated that an outlay of between £1,000 and £1,200 per mile will be necessary to repair the roads. The County Council has disregarded the request of the Parish Council that no obstacle should be placed in the way of the extended service.

The London General Omnibus Company have renewed their application to Romford Council for sanction to running their vehicles in that authority's area. The surveyor reported that an outlay of £4,000 would be necessary to fit the roads for such traffic, and he advised that the question should be deferred for a year. The Council declined to accede to the application, and appointed a committee to inquire as to the feasibility of running their own omnibus service.

DOUBLE-DECK CAR WITH FRONT EXIT.

So successful has been the working of single-deck cars with front exits at Newcastle-on-Tyne that the Corporation Tramways Department have completed designs for the alteration of double-deck cars to this principle of unloading. Mr. E. Hatton, the general manager, is to be congratulated upon the success that has attended his enterprise in adapting single-deck cars to front exit working, and at the same time increasing the accommodation of these vehicles. In our issue of April 13 we gave a full description of what has been accomplished in that direction, the article being illustrated by four photographs. If the operation of double-deck cars on the same principle proves similarly successful, the innovation is bound to have far-reaching results on tramway working generally. Not only will the loading of a car be facilitated, but the journey times will be reduced, and there will be fewer accidents, with a decrease in compensation charges.

COAL CONSUMPTION FOR LIGHTING.

The appended communication has been forwarded by the Board of Trade to gas and electric lighting undertakings, with a request to inform their consumers that the consumption of coal for lighting purposes must be reduced by ten per cent.

I am directed by the Board of Trade to state that, as you will be aware, difficulties have been experienced for some time in securing adequate supplies of coal for manufacturers of munitions and other consumers of national importance owing to the decline in the output of coal from the mines and the increase in the demand for war purposes. The position has been met in the past to a large extent by a restriction of export, but the coal which is now being exported goes largely to meet the urgent requirements of our Allies or is valuable as a weapon in negotiating with neutral countries.

The Board have observed with some concern the recent decline in coal exports, and in their opinion, it has become necessary that special steps should be taken to maintain and if possible to increase the exportable surplus of coal, and that for this purpose everything possible should be done to encourage economy in the use of fuel at the present time. The question has been further considered by the Central Coal and Coke Supply Committee, and they have recommended that a general policy of economy in lighting should be adopted, and that gas and electric lighting undertakings should be asked to do what they can to reduce consumption by a definite amount.

The Board think there can be little doubt that there are many cases in which light is at present being used needlessly, or wasted altogether. They have accordingly decided to request the owners of gas and electric lighting undertakings that they should notify to their consumers that the Government desires to see the consumption of coal for lighting purposes reduced by 10 per cent., and that they should do all in their power by notices and inspection to see that this recommendation is carried out. The Board would suggest that inspectors should be sent round as often as possible to examine meters, and hand to the consumers, where necessary, a notice reminding them of the recommendation and calling attention to the fact that they have not yet carried it out. The Board would be glad to be informed in due course of the steps which are being taken in the matter.

RESTRICTION OF OMNIBUS SERVICES.

The House of Commons on May 2 considered the Lords' amendments to the Local Government (Emergency Provisions) Bill. On a new clause which had been inserted by the Lords providing that motor omnibuses and chars-a-bancs should not ply for hire on routes on which they had not plied for twelve months before March, 1916, except with the consent of the local authority.

Mr. Joynson Hicks (Brentford) moved to substitute two years for twelve months in the clause. There was a committee now sitting on the question of heavy motor regulations and taxation, and another one was to be set up to consider the whole question of roads. His amendment and others which he proposed to move had, he understood, the assent of the Local Government Board. A large number of omnibuses had been taken off the roads to be used on war service. The object of his first amendment was to put things back to the pre-war basis. His second and third amendments were to give an appeal to the Local Government Board. His fourth amendment was to meet the case where munition workers were conveyed by omnibuses which did not ply for hire.

Mr. Hayes Fisher (Parliamentary Secretary, Local Government Board) said that the new clause was supported by the County Councils. The Local Government Board had no objection to it. This was an emergency Bill which would last only for one year after the war. Highway authorities had been very heavily hit by the road traffic. No grants could now be obtained from the Road Board. Omnibuses would be allowed to use routes on which they had plied for twelve months, or for two years if the present amendment were accepted. He proposed to accept all the amendments of Mr. Joynson Hicks.

Sir J. Spear (Tavistock) hoped that the clause would be made a permanent one. Motor omnibuses had caused an enormous expenditure to local authorities.

Mr. Denniss (Oldham) objected to the clause on the ground that it endeavoured to establish the principle of local veto over traffic. If there was to be a veto it should be given to the Local Government Board. The fact that we were superior to the rest of the world in heavy motor traffic was because that trade had not been fettered by the local authorities as light railway traffic and tramways had been by the State and local authorities.

Mr. Joynson Hicks' amendments to the clause were agreed to, and the clause as amended was approved.

London Post Office Underground Railway.—Colonel Norton Griffiths, M.P., having suggested that work on the construction of the London Post Office underground railway should be suspended in order to release the large number of men employed for service in the Royal Engineers, the Postmaster-General has stated that he is considering whether it would not be advisable to release some of the men now employed on the tunnel.

Digitized by Google

MISCELLANEOUS NEWS AND NOTES.

Depôt Extension at Halifax.—The Tramways Committee propose to extend the Skircoat depôt, at a cost of £2 700.

Automatic Protection for Generators.—West Ham electrical engineer has placed orders for the supply of further automatic protective devices to be used in connection with the three main generators.

Electric Delivery Drays.—The Midland Railway Company is experimenting with electric drays for delivering goods in the outlying districts of Sheffield. Three accumulator vehicles are being used and it is reported that they are giving complete satisfaction.

Extensions to Rochdale Power Station.—The Council propose to apply for sanction to borrow £60,000 in order to carry out the scheme submitted for extensions to the electricity works and plant by Mr. S. L. Pearce, the city electrical engineer of Manchester.

Leeds Electricity Works.—A report has been presented to the Corporation recommending that application be made for sanction to borrow £30,000 for additional cost of buildings for the new generating station of the electricity undertaking, £20,000 for mains and £15,000 for sub-stations.

Suspension of Dublin Tramway Service.—A number of the Dublin United Tramways Company's cars were destroyed or damaged during the rebellion that broke out in the city on Easter Monday. The service had since been suspended, but an announcement was made that it would be restarted on some sections on Tuesday last.

Car Identification in Darkened Areas.—Complaint is made in a northern town that the destination indicators are not illumined owing to the air-raid precautions, and that the illuminated route number plates are not always placed in position. Under those circumstances people have to risk their safety by leaving the footpath in order to inquire the destination of the car.

Proposed Tramway Centre for Manchester.—It is understood that the Committee on Traffic Congestion will recommend Manchester Corporation to allow the old infirmary site in Piccadilly to be utilised as a tramway centre, in order to lessen the congestion in the approaches to that place. Nearly three thousand tramcars pass along Piccadilly and up and down Market Street each day, or an average of about eighty an hour.

Track Doubling on the Woolwich Lines.—Woolwich Council have consented to the proposal of London County Council to double the single tramway track at Plumstead High Street, and Borstal Hill, where road widenings will not be necessary. As to sections where street widenings are required in order to effect doubling of the track, the Council have invited the county authority to form a joint deputation to the Ministry of Munitions for the purpose of inviting their assistance financially.

Free Riding at Bradford.—During the year ended March 31 443,230 free tickets were issued to soldiers, Belgians, and visitors attached to the Lord Mayor's Relief Fund. The aggregate value of these tickets, estimated at 1½*d.* each, amounted to £2,770. The tickets were issued to the various classes of free riders in the following proportions: Soldiers, 333,400, of the value (on the basis of 1½*d.* per ticket) of £2,084; Belgians, 97,180 (of the value of £607); Lord Mayor's Relief Fund visitors, 12,650 (of the value of £79).

A Runaway Cable Car.—Owing to the stranding of the cable the gripper of an Edinburgh tramcar, on April 28, became so firmly fixed that the driver was unable to release it. The car therefore maintained its maximum speed, overtook two others, and drove them before it. Opposite East Preston Street a collision occurred with a dust cart, which collided with a motor-car, the latter having a wheel wrenched off. By the time the cable was stopped at the power station the cars had crossed the points at Salisbury Place and travelled half-way down the hill towards Liberton. Traffic was considerably delayed.

South Shields Tramwaymen as Searchlight Crews.—A number of the employees of South Shields Corporation Tramways department who joined the Tyne Electrical Engineers last year took part in the successful attack that led to the Zeppelin L15 sinking off the Thames estuary. For their manipulation of a searchlight on that occasion they have received, through their captain, Field Marshal Lord French's high appreciation of their work. Three of the tramwaymen who have been specially mentioned for their services are Sapper T. Brown (late inspector of the tramways), Sappers M. Moran and J. Burdon.

Detected by a Manager.—A conductor was recently charged at Derby with embezzling a penny. The magistrates ordered him to pay 10*s.* towards the costs and gave him a chance to retrieve his character without a conviction being recorded against him. The witness in the case was Mr. A. B. Slater, manager of Burton Corporation Tramways. He tendered a penny as he stood on the footboard, and noticed that the conductor had, in addition to the bundle of tickets in his hand, one that had been cancelled. This the accused pretended again to punch, Mr. Slater noticing that the punch bell did not sound, while the ticket was not properly issued for that journey, as it marked a section for an opposite journey. When his attention was called to the matter defendant said he had previously punched the ticket for another passenger in mistake. Mr. F. Harding, the general manager, said it was against regulations to use a cancelled ticket, but there was an arrangement for dealing with one issued in mistake.

The Croydon Strike.—Not content with receiving two rebuffs from the Penge and Croydon County Benches, by the dismissal of summonses relating to unlicensed employees on the South Metropolitan Company's cars during the recent strike, the Metropolitan Police on May 2 brought sixteen similar summonses against Croydon Corporation Tramways Department. The Town Clerk submitted that none but competent drivers had been placed in charge of cars, and the borough justices dismissed the cases. The manner in which the police have placed impediments in the way of the tramways of the Metropolis has increased if anything during the war, and has become a scandal. The great tramway undertakings of the provinces would not permit such a state of affairs, and it is time that another effort was made to secure the formation of a Traffic Board for London. In both of these cases temporary licences were applied for, but the antiquated procedure of the police is not capable of meeting the public convenience and the needs of munition workers in an emergency. This was also shown last summer when the shortage of men caused other managers to employ unlicensed men during pressure of traffic. Croydon Tramways Committee and their manager may be complimented upon having defeated the strike, for forty cars are now running out of a stock of seventy-five.

Standard Steel Specifications for Automobile Construction.—It will be remembered that in December, 1914, a meeting was held by the Institution of Automobile Engineers in Birmingham and an invitation was issued to those interested in the manufacture of steel for automobile engineering. A paper was read by Mr. L. H. Pomeroy, emphasising, among other things, the need for a reduction in the number of steels then in use in automobile construction and also for a better understanding between automobile engineers and steel makers. The outcome was the appointment of a Committee consisting of steel manufacturers, stampers and automobile engineers. As a result of less than twelve months' labour this Committee have suggested a series of ten standard steel specifications for use in automobile construction, and these specifications have been finally approved by the Engineering Standards Committee and are being issued by that body. At the next meeting of the Institution of Automobile Engineers, to be held at the Royal Society of Arts on May 10, Mr. L. H. Pomeroy, who has acted as Chairman of the Committee mentioned above, will read a paper dealing with these specifications, setting forth the reasons which led to the adoption of the particular steels chosen and specifying the uses to which each of them may be put. This paper will form an important adjunct to the standard specifications as issued by the Engineering Standards Committee. The subject forms a fitting close to the session, as it brings to light the task that has occupied the efforts of the Institution for some time past.

PERSONAL.

Mr. H. A. Kell, assistant electrical engineer to Luton Corporation' has been recommended by the Electricity Committee for an increase of £15 in his salary of £200.

Mr. E. Bignell has resumed duty as installation superintendent at Sutton with the South Metropolitan Tramways and Lighting Company on being invalided from the army.

Mr. F. P. Dolamore, who has acted as deputy to the late Mr. F. W. Lacey for many years, has been appointed borough engineer and surveyor of Bournemouth *pro tem.*

Mr. John F. Cameron, general manager and electrical engineer, Northampton Corporation Tramways, has returned to duty after his recent accident.

Alderman G. Brodie, chairman of Blackpool Tramways and Electricity Committee, has undergone a long and serious illness. Upon reappearing at the Council meeting on May 1, he was warmly congratulated on his recovery.

Mr. H. P. Gibbs, consulting electrical engineer to the Government of Mysore, and general manager of the Tata hydro-electric installation in Bombay, has been granted leave of absence to return to the United States.

Mr. G. Morris and Mr. E. J. Riley, car shed superintendent and chief clerk respectively, Leicester Corporation Tramways, have been awarded increases of salary, the former from £260 to £285, and the latter from £200 to £215.

Mr. P. J. Pringle, M.I.E.E., M.I.M.E., has been appointed consulting engineer and assessor to the Tramway Board recently formed, and will act in connection with the transfer of the Melbourne Tramway and Omnibus Company's undertaking to the Tramway Board. Mr. Pringle is general manager and chief engineer of the Electric Supply Company of Victoria, Ltd., and will continue to discharge these duties.

Mr. W. E. Hardy, general manager and engineer, Bath Electric Tramways Company, and his staff were paid a compliment by Sir J. Sivewright, the chairman, at the annual meeting. Sir James remarked that it was satisfactory to know that the company and their staff had the confidence of the people of Bath. The company were excellently served by their officials and staff, who, without exception, put their heart and soul into the work.

CONTRACTS AND ORDERS.

Mitcham Council have placed an order with Sir W. Burnett and Co. for the supply of wood blocks, at £13 7*s.* 6*d.* per thousand.

Leyton Tramways Committee have placed an order with Messrs. Edgar Allen & Co., Ltd., of Sheffield, for a lay-out.

Southend Council have placed an order with the British Insulated and Helsby Cables, Ltd., for six miles of trolley cable.

Salford Council have accepted a tender by the Albion Motor Car Co., Ltd., for the supply of an additional four-ton Albion petrol motor wagon, at £806.

P. R. Jackson and Company has received an order from Walthamstow for twenty-four commutators for the tramways department, the price being £5 5*s.* each.

W. T. Henley's Telegraph Works Company's tender for the supply of cables for the ensuing year has been accepted by Walthamstow Council.

Digitized by Google

Salford Electricity Committee have awarded a contract to the British Westinghouse Company for the supply of transformers, and to the Underfeed Stoker Company, for two mechanical boilers.

Mr. G. P. Wilson has received a contract from Southampton Tramways Committee for brake blocks and castings, at £5 12s. 6d. per ton, an increase of 8s. per ton as compared with last year.

Coal Contracts.—East Ham Council have accepted tenders for 11,000 tons of coal for the electricity works for twelve months at prices ranging from £1 2s. 5d. to £1 8s. 11d. For slack the charges are from 16s. 5d. to 19s. 5d. per ton.

Bolton Tramways Committee have entered into a contract with the Woods-Gilbert Planing and Grooving Machine Co. for the treatment of hammered joints and corrugations. A sub-committee had inspected work done at Wigan and Denton.

East Ham Council have allotted a contract for top dressing granite setts on the tramways to Mr. G. Battersby, at 1s. 3d. per yard super, and to W. Stone and Son, for engineers' sundries for the tramways and electricity departments.

Manchester Tramways Committee have placed the following contracts:—Bell Punch and Printing Co., Ltd., tramcar passenger tickets; Drake and Gorham, Ltd., half-watt lamps and drawn-wire filament traction lamps; General Electric Co., Ltd., carbon-filament lamps, half-watt lamps and drawn-wire filament lamps.

Lack of Brass Buttons for Uniforms.—It has been reported to Plymouth Council that uniforms for the employees on the Devonport section were ordered in January, but in consequence of the war the contractor had been unable to supply them. The difficulty was lack of buttons. The contractor had asked for the buttons to be cut off from the old uniforms and sent to him.

Shanghai Municipal Council have recommended for acceptance the following tenders:—Scholey & Company, Taylor underfeed stokers, induced and forced draught fans, and chimney for two boilers, £5,370; C. A. Parsons & Company, 10,000 kw. turbo alternator, £32,605; General Electric Company of New York, 10,000 kw. turbo-alternator, £31,720; Fraser & Chalmers, 5,000 kw. turbo-alternator, £16,009; Babcock & Wilcox, eight marine type water-tube boilers, £65,217; Fraser & Chalmers, coal handling plant, £9,867; British Thomson-Houston Company, e.h.t. switchgear for Riverside Works (22,000 volts), £7,575; h.t. switchgear for Fearon Road Station (6,600 volts), £1,565; e.h.t. switchgear for Fearon Road Station (22,000 volts), estimated cost £3,000; Mather & Platt, circulating water pumps for condensers, £3,697; Westinghouse Manufacturing Company, static transformers, £12,300; British Insulated and Helsby Cables, 40,000 yards split conductor e.h.t. underground cables; United States Steel Products Company, steel work for buildings, £8,026.

FINANCIAL REPORTS AND MEETINGS.

City of Buenos Ayres Tramways Company.—The directors have declared a dividend of 1s. 3d. per share (being at the rate of 5 per cent. per annum), less income tax, for the three months to March 31.

Colombo Electric Tramways and Lighting.—On the past year's working the directors announce a dividend of 10 per cent., free of tax, the placing of £15,000 to general reserve and renewal fund, and carrying forward £8,165.

Southport Tramways Company.—The accounts for the year 1915 show a total revenue, including £150 brought forward, of £17,549. After deducting all expenses, appropriating £2,299 for repairs and maintenance, and £500 for renewals, the directors propose to transfer £1,000 to reserve, and carry £141 forward.

Rochdale Corporation Tramways.—Despite a decrease in the car miles the gross receipts for the past year increased from £83,401 to £87,908. The net surplus is £3,608, against £4,284 the previous year, although the working expenses have been increased by £3,800 by payments to employees on active service and bonuses and extra income tax.

Tramways and General Works Company.—The report for 1915 states that, including the balance brought forward, the amount now standing to the credit of the profit and loss account is £540, out of which the directors recommend the payment of a dividend at the rate of 4d. per share (less income tax), which will absorb £333, and leave £206 to carry forward.

Peterborough Electric Traction Company.—For 1915 the revenue totalled £12,560, as compared with £10,967. After deducting all expenses chargeable to revenue, including repairs and maintenance and debenture interest and setting aside £1,600 to renewals fund, there remains £1,484, which, added to £256 brought forward, makes an available balance of £1,741. This is to be applied in payment of one year's arrears of preference dividend, £1,320; leaving £421 to be carried forward.

York Corporation Tramways.—For the past year the traffic receipts increased by £5,916. This was the first year of the motor omnibuses, and the combined mileage of the cars and omnibuses was 828,517 as against 766,360 the preceding year. The number of passengers was 8,204,719 as against 6,712,631, whilst the total receipts were £34,887 as against £28,971. The receipts per mile were 10.10d. as against 9.07d. During March the omnibuses carried 59,755 out of a total of 669,425 for the two means of traction, as compared with 592,458 in the corresponding month of 1915.

Barnsley and District Electric Traction Company.—The revenue for the year amounted to £20,820. After providing for all expenses chargeable to revenue, including £1,675 for debenture and loan interest, and setting aside £2,500 to the renewals account, the surplus is £2,487, including £1,544 brought forward from the previous year. The directors recommend that this balance should be applied as follows: Dividend for 1915 at the rate of 6 per cent. per annum on preference shares, £1,320; dividend at the rate of 5 per cent. per annum on ordinary share capital, £1,001; leaving £165 to be carried forward.

Bath Electric Tramways Company.—After providing for the preference dividend, the 4½ per cent. debentures, and the sinking fund, the company's operations for the past year show an available balance of £8,486. At the annual general meeting the directors recommended that that sum should be added to the reserve for depreciation and renewals. The loan from the bank had been brought down to £16,000. Originally it was £28,000. Sir J. Sivewright, who presided at the annual meeting on April 27, said the receipts showed a decrease of £5,558, which was largely attributable to the reduction of the company's motors in the latter part of 1914, when a large number of them were transferred to the military service. Economies in operation and expenses more than offset the diminution in receipts, so that they had actually a greater net revenue. The plant, rolling stock, and permanent way were all in an efficient condition. Two hundred and twenty-one employees had either joined the forces or attested. The gross balance was £20,085 and the net balance £8,486. The reduction of the loan had improved the value of the shares. There was a promising future before the company, and if they pursued their present policy they would have an improved fleet and their foundry would be extended. They had a splendid business. Like all the shareholders, he wished to get a dividend, but he wanted to make sure that when the company did commence paying dividends on the ordinary shares they would be able to continue to do so. Colonel H. F. Clutterbuck was re-elected a director.

Belfast Corporation Tramways.—Mr. Andrew Nance, general manager, has presented his eleventh annual report to the Tramways and Electricity Committee. The report covers the year ended March 31, 1916, and shows that the total revenue amounted to £280,641, while the working expenses were £159,801, making a trading profit of £120,840, an increase of £7,515 as compared with the results of the previous year. The net revenue charges, including interest on debt, income tax, etc., and deducting the credit balance on Glengormley Pleasure Grounds account, amount to £64,104, leaving a sum of £56,735 (an increase of £5,235) for appropriation, which is strictly defined by the Aberdeen Clause of the Belfast Tramways Act, 1904, and is as follows:—

Sinking fund	£32,434
Depreciation fund	17,000
General Purposes fund (amount promised for 1915-16)	5,000
General Purposes fund (on account of £15,000 promised for 1916-17)	2,302

Mr. Nance calculates that the payments to the dependants of employees with the Forces, which are included in the working expenses, and the war bonuses amount to £10,081. Notwithstanding these serious additions to expenditure, the increased cost of power, material, etc., all the usual financial charges, including depreciation, have been fully met. A year ago Mr. Nance estimated that the total receipts would reach £283,000. He calculates that £2,090 were lost by reducing the service for eleven weeks on some of the routes from a ten to twenty minutes service, which it may be added was contrary to his advice. If the amount thus lost be added to the actual receipts, it produces a sum practically equal to the original estimate. The results for the current year ending March 31 1917, Mr. Nance estimates as follows:—Total receipts, £298,750; working expenses, £165,120; trading profit, £133,630; net revenue charges, £64,450; net profit, £69,180; appropriation charges, £52,000; surplus, £17,180.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended April 22 (including Easter Monday) the latest period for which full returns are available, give total receipts of £185,980, or £19,895 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £78 14s. 9d. per mile of single track, and last year at the rate of £72 9s. 10d., thus showing an increase for the week of £6 4s. 11d. per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. May 4.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. A.	—	67	69	69
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	73/9	72/6
4%	4%	Do. 4% Deb. ...	100	91	74	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	73	73½
5%	5%	Do. 5% Deb. ...	100	96	78	78
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	19/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	92½	92½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	87½	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$½	$1	Brazilian Trac. & Power Ord....	$100	66	56¼	56¼xd
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92½	92½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	89/4½	89/4½
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	39¾	39¾
5%	5%	Do. 5% Cum. Pref.	100	103	54¾	54¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80¾	85½xd
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	62¾	62¾
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	71	71
70/-	70/-*	Do. 7% Pref.	100	55½	48	47½
—	—	Do. 6% Pref. Ord.	100	17½	16½	17½
—	—	Do. Def. Ord.	100	11	9¾	10½
5%	5%	Do. 5% Deb.	100	92	79	79
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70½xd	70½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	94½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¾	6½	6 11/32
1/3	1/3	City of B.A. Trams.	5	5⅛	92/3	92/3
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11⅜	11⅜
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¾	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅞	1/9	1/9
5/6	6/-	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	8/6	8/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89¾	89¾
5%	5%	Do. 5% Inc. Deb.	100	88½	78½	78½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	49½	49½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	98/6	98/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70	70
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	79½	78¾
$1¾	$1¾	Mexico Trams. Common ...	$100	70	25¾	25
5%	5%	Do. 1 Mt. 5% G.B.	—	84	39½	40
6%	6%	Do. 6% Mt. Bds.	100	76	34¾	34¾
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	92½	92½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½xd	94½
1/2*	1/2½*	National Steam Car	1	15/32	14/-	14/-
9¾d.*	9¾d.*	New General Traction	1	⅞	7/9	7/9
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	3/16	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4¾	55/-	55/-
5%	5%	Do. 5% 1st Deb.	100	89½	75	75
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	13/16	10/7½	10/7½
8d.	10d.	Provincial Trams. Ord.... ...	1	⅞	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	90	89¾
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74½	73¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	88½
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	78½
—	—	Singapore Elec. Trams	5/-	¾	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	94	99½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	86	86xd
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	91	91
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	74	74
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅞	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Increase or Dec.
Anglo-Argentine	Apr. 29	£50,995	£52.781	18	£866,249	— £1,147
Auckland.....(28 days)	Mar. 10	19,907	20,711	36	189,937	+ 3,002
Ballarat and Bendigo ...	Feb. 27	3,469	3,512	48	39,843	— 2,718
Brazilian Traction Mlrs.	Mar.	6.294 910	6,711,000	13	19,220,000	+1,131.400
Brisbane	Mar.	30,740	34,275	13	96,875	+ 9,925
British Columbia.....$	Mar.	557,135	577,117	39	4,982,147	— 772,894
Buenos Aires Lacroze ...	Apr.10	41,765	40,220	43	413,102	— 8,139
Burmah Tramway ... Rs.	Apr. 22	3,758	3,456	38	...	+ 7,321
Calcutta.....Rs.	„ 22	62, 452	64,524	17	1,089,330	+ 67,441
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	Apr.	1,496	2,513	18	9,930	+ 3,272
Cordoba	Mar.	12,746	13,598	52	161.906	+ 6,251
East India	Apr.	1,864	2,116	39	18,706	+ 1,466
Hong Kong .....$	Mar. 25	9,776	11,502	15	160.942	+ 19,037
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Mar.	34,185	34,159	13	101,073	+ 3,681
Lisbon .....Escu.	Mar.	...	175,706	13	522,600	...
Madras (2 weeks).....Rs.	Apr. 30	30,370	32,361	17	251,470	+ 23,409
Manila .....$	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8*	20,067	— 5,340
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Mexico .....$	*	...	...	...	...	...
Montevideo	Apr.	26,786	28,997	26	187,419	+ 12,764
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Apr.	4,964	4 849	18	19,787	— 74
Shanghai .....$	Apr. 5	24,690	28,327	...	...	...
Singapore .....$	Apr. 1	10,817	11,045	13	157,154	+ 19,111
Toronto.....$	Mar.	820,750	910,969	13	2,663,575	+ 232,148
Winnipeg	Mar.	303,209	296,500	13	887,310	— 81,239

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	Apr. 25	£310	£444	+ £134	4	£1,432	+ £74
Aberdeen Corporation...	„ 26	1,564	1,734	+ 170	47	83,617	+ 5,273
Accrington Corp.....	Feb. 2	443	534	+ 91	44	24.521	+ 1,014
Ayr Corporation	Apr. 30	308	442	+ 133	51	17,656	+ 1,205
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 30	1,326	1,569	+ 243	4½	6,275	+ 388
Birmingham Corp.	„ 29	12,762	17,916	+ 5,154	4	68,556	+ 11,368
Do. Motor Omnibuses	„ 29	745	1,176	+ 430	4	3,754	+ 488
Blackburn Corp.	„ 26	1,172	1,953	+ 781	4½	5,883	+ 84
Blackpool & Fleetwood..	„ 29	338	754	+ 416	16	5,479	— 201
Blackpool Corp.	„ 27	660	3,381	+ 2,721	4	6,198	+ 1,795
Bolton Corporation.....	„ 30	2,576	3,017	+ 441	5	12,952	+ 558
Bournemouth Corp.....	May 3	1,988	2,394	+ 406	5	10,976	— 35
Bradford Corporation ...	Apr. 29	6,363	8,814	+ 2,451	4	29,441	+ 309
Brighton Corporation ...	„ 30	971	1,431	+ 460	4⅞	4,878	+ 357
Bristol	„ 28	9,038	11,233	+ 2,195	17	157,798	+ 9,534
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 29	1,477	1,862	+ 385	5	8,813	+ 898
Burton-on-Trent Corp...	„ 30	280	280	nil	4	1,079	— 121
Bury Corporation.....	„ 30	1,334	1,607	+ 273	4⅞	6,503	+ 171
Cardiff Corporation.....	„ 22	2,426	2,693	+ 267	3	8,763	— 92
Chatham & District.....	„ 27	1,042	1,523	+ 481	17	18,226	+ 1,027
Chesterfield Corp.	„ 20	251	272	+ 21	3	774	— 15
Colne Corporation	„ 29	232	314	+ 82	...	...	...
Cork Electric	„ 27	523	508	— 15	17	7,643	— 12
Croydon Corporation ...	„ 21	1,669	958	— 711	3	4,013	— 342
Derby Corporation	„ 29	959	1,273	+ 314	4½	4,762	+ 188
Dover Corporation	„ 29	264	343	+ 79	4	1,256	— 9
Dublin & Lucan	„ 21	139	135	— 4	16	1,859	— 164
Dublin United	„ 14	6,326	5,989	— 337	15	87,417	+ 3,402
Dundee City	„ 26	1,285	1,354	+ 69	49¾	66,912	+ 3,698
East Ham Corporation	„ 29	1,315	1,435	+ 120	4½	5,370	— 143
Exeter Corporation.....	„ 28	356	465	+ 109	4	1,501	+ 25
Glasgow Corporation	„ 29	22,426	23,082	+ 656	48	1,042,963	+ 75,654
Glasgow Subway.....	„ 29	1,086	1,133	+ 47	17	21,111	+ 2,518
Glossop (U. Elec. Supp.)	„ 29	119	154	+ 35	18	2,350	+ 357
Halifax Corporation.....	„ 25	1,957	3,159	+ 1,202	3⅞	8,488	+ 5
Do. Motor Omnibuses	„ 25	46	64	+ 18	3⅞	167	— 28
Hastings & District.....	„ 21	932	911	— 21	16	11,818	— 425
Huddersfield Corp.	„ 29	2,480	4,216	+ 1,736	4	12,367	+ 1,761
Hull Corporation	„ 29	2,998	3,044	+ 46	4	12,732	— 991
Ilford U.D.C.	„ 29	610	832	+ 222	4	2,917	+ 342
Ilkeston Corporation ...	May 3	121	125	+ 4	5	654	+ 53
Ipswich Corporation	Apr. 29	425	573	+ 148	4	2,028	+ 229
Isle of Thanet	„ 29	310	502	+ 192	21	7,838	— 1,218
Kilmarnock Corp.	„ 29	164	182	+ 18	50	8,315	+ 338
Lanarkshire	„ 27	1,870	2,576	+ 646	17	36,324	+ 6,194
Lancashire United	„ 26	1,629	2,563	+ 934	17	27,847	+ 1,731
Leeds City.....	„ 29	8,401	11,833	+ 3,432	5	41,331	+ 5,713
Leicester Corporation ...	„ 29	2,939	3,842	+ 903	17	55,338	+ 7,056
Leith Corporation	„ 29	706	827	+ 121	50	38,527	+ 3,614
Leyton U.D.C.....	„ 27	1,516	2,009	+ 493	4	6,604	+ 15
Liverpool Corporation...	„ 22	12,850	13,567	+ 717	16¼	213,137	+ 10,043
Llandudno & Colwyn B.	„ 28	308	580	+ 272	21½	4,584	+ 153
London County Council	Mar. 29	46,463	44,069	— 2,394	51⅞	2,299,705	— 27,382
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	Apr. 29	154	144	— 10	29½	3,839	— 1,143
Maidstone Corporation..	„ 27	178	257	+ 79	4	949	— 3
Manchester Corp.....	„ 29	17,326	20,066	+ 2,740	4	77,779	+ 5,532
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	„ 22	169	269	+ 100	3½	737	+ 62
N'castle-on-Tyne Corp.	„ 22	5,821	6,111	+ 290	3	19,268	— 1,648
Newport (Mon.) Corp....	„ 29	815	1,030	+ 215	4	3,836	+ 1,076
New St. Helens & Dist.	„ 26	957	1,426	+ 469	43	42,909	+ 3,406
Northampton Corp.....	„ 28	701	894	+ 193	4	2,734	— 189
Nottingham Corp.....	„ 27	3,436	4,362	+ 926	4	15,099	+ 487
Oldham Corporation ...	„ 30	2,291	2,894	+ 604	5	13,316	+ 887
Portsmouth Corp.....	„ 22	2,408	2,515	+ 107	4	7,914	...
Preston Corporation.....	„ 26	873	1,185	+ 312	3⅞	3,902	+ 241
Provincial	„ 29	2,077	2,816	+ 739	30	62,902	+ 4,213
Reading Corporation.....	„ 27	710	902	+ 192	3⅞	3,106	+ 273
Rhondda Tramways.....	„ 13	1,238	1,195	— 44	15	17,223	+ 486
Rochdale Corporation...	„ 29	1,594	2,025	+ 431	4½	8,107	+ 520
Rotherham Corp.....	May 3	1,044	1,352	+ 308	4½	6,695	+ 1,679
Salford Corporation.....	„ 1	4.996	5,680	+ 684	4⅞	24,152	+ 1,669
Sheffield Corporation....	Apr. 30	8,494	11,439	+ 2,945	5	51,847	+ 9,184
Southampton Corp.....	„ 26	1,324	1,770	+ 446	3	5,676	+ 210
Southend-on-Sea Corp...	„ 26	684	1,214	+ 530	4	2,980	— 283
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 29	720	892	+ 172	4½	3,354	+ 249
Sunderland Corp.....	„ 30	1,369	1,592	+ 223	4	6,736	+ 241
Sunderland District...	„ 26	591	889	+ 298	26	14,969	+ 1,126
Swindon Corporation ...	„ 26	173	255	+ 82	3⅞	737	+ 59
Torquay Tramways.....	„ 20	563	489	— 74	16	6,731	— 351
Tyneside Trys. & Tmrds.	„ 26	562	675	+ 113	17	8,563	— 230
Wallasey Corporation ...	„ 29	1,177	1,658	+ 481	4½	5,568	+ 251
Walsall Corporation.....	„ 29	678	1,090	+ 412	18	13,612	+ 1,982
Walthamstow U.D.C....	„ 29	806	1.370	+ 564	4	4,457	+ 913
Warrington Corp.....	„ 27	420	525	+ 105	4	1,911	+ 245
West Ham Corporation	„ 27	2,966	3,691	+ 725	3⅞	12,628	+ 809
Wigan Corporation	„ 27	1,439	2,012	+ 573	4	6,586	+ 368
Wolverhampton Corp....	May 3	1,080	1,160	+ 80	5	5,856	+ 752
Yorkshire (W. Riding)...	Apr. 30	1,534	2,410	+ 876	18	29,532	+ 3,001

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, MAY 11, 1916. VOL. XXXIX.

PARIS MUNICIPAL TRAMWAYS ELECTRIFICATION.

PROGRESS OF A CONVERSION BEGUN IN 1911 AND INTERRUPTED BY THE WAR.

Owing to the war the great work of transforming the Paris Municipal Tramways from a varied collection of traction systems to the general use of electric trolley and conduit, which was begun in 1911, has progressed but slowly towards completion. Fortunately a good deal of the conversion work was carried out during 1912 and 1913, and as this includes the most important tramways in the Paris area, the present time is opportune for a survey of the work already completed.

Before entering upon such a description, reference may be made to the working results recently published of the leading Paris traction company during the years 1914-1915, viz., the Paris General Omnibus Company, who are the lessees of the municipal tramways. On the outbreak of war the motor omnibus services ceased entirely at 5 p.m. on Saturday, August 1, 1914, the whole of the vehicles being requisitioned for military purposes. The company's tramway services were disorganised by the mobilisation of the greater part of the staff, and for some months not more than half of the 28 routes worked by the company could be served. Six out of the eleven depots were also closed, and the daily car kilometres run dropped from 86,991 to 24,608, a decrease of 37,577 miles.

Fig. 1.—Conduit Tramways Under Construction in Trinity Place, Paris, in 1913.
Motor Omnibuses of the Type in Use before the War.

Digitized by Google

By strenuous efforts the services were gradually re-established to some extent; four of the closed depots were again opened, and the daily car kilometres raised to 56,886 in December, 1914, and 67,103 by May, 1915. Out of 12,000 workpeople employed, more than two-thirds had been mobilised, and as many as 817 motormen out of a staff of 948, the company being obliged to train nearly 700 new men during the above period. More than 600 women—wives or daughters of mobilised employees—are employed in cash-taking and checking.

Fig. 2.—Paris Omnibus of 1828.

Nearly all the motor omnibus garages and former horse depots have also been requisitioned by the military authorities, while the central workshops, which are thoroughly well equipped and organised, have contributed very largely to munition work.

Total receipts for the year 1914 from omnibuses and tramcars amounted to 43,040,198 francs—a sum nearly 27 per cent. less than the total for 1913, this reduction being entirely due to the war and consequent dislocation of traffic. The omnibus kilometres amounted to 23,356,028 (equal to 14,597,517 omnibus-miles), the receipts being 21,344,558 francs. The average receipt per omnibus kilometre was 91·39 centimes (equal to 1s. 2½d. per omnibus mile); the omnibus passengers totalled 151,919,920. The car kilometres for the year reached a total of 26,357,729, giving receipts of 21,695,640 francs, and an average of 82·31 centimes per car kilometre (equal to 1s. 1d. per car mile), carrying a total of 174,887,247 passengers.

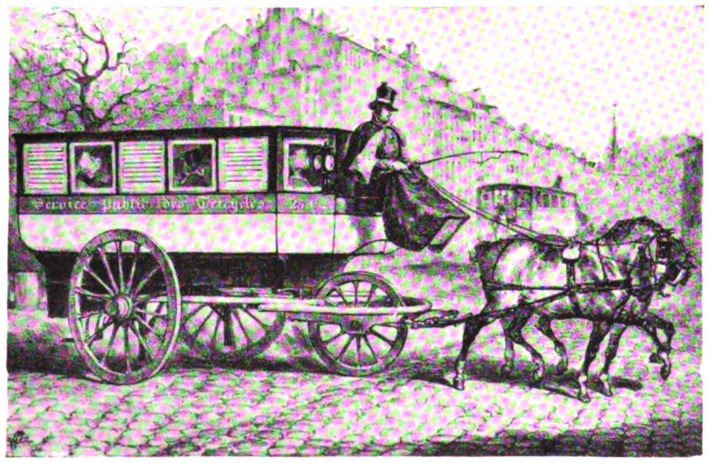


Fig 4.—Three-Wheeled Omnibus—An Early Parisian Type.

A comparison between the state of affairs at August 1, 1913, and the same date in the following year shows that up to the last-named date the enterprise was making steady progress, with excellent results both from tramways and motor omnibuses, even allowing for the difficulties inherent to a transition stage in the traction systems employed. If it had been possible to complete the entire network in the time estimated under normal conditions, the final results for the year would have been exceedingly satisfactory. As it is, the management may be congratulated on achieving such an excellent result as is given by the final figures, which show a net profit of 7,066,149 francs, the total expenses being 36,747,887 francs.

Despite the difficulties of labour shortage and high cost of materials, several of the new lines and sections have been brought into use during the year.

Development of the Tramways Since 1856.

For the following description of the Paris General Omnibus Company's tramways undertaking we are largely indebted to a paper read before the Society of Civil Engineers in Paris by Monsieur A. Mariage, general manager of the omnibus company, who two years ago was consulted by the London County Council with reference to the extension of their tramways at terminal points in the central districts. Monsieur Mariage traces the history of street omnibus and tramway traffic from 1828, when the first omnibus services were begun. Some of the vehicles then used are illustrated in Figs. 2, 3, and 4. In 1855 the ten separate companies amalgamated to form one undertaking, which took the title of General Omnibus Company, a name still continued, but embracing the operation of tramways as well as omnibuses. For the first ten months of working the passengers carried were 40,000,000, and the receipts £334,500. By the year 1909 the traffic had increased to 114,795,000 passengers, or nearly threefold, on the omnibus routes only, quite apart from the tramway services of a later growth. There were then 43 omnibus routes in operation, of which 36 were worked by horse vehicles and seven by motor omnibuses, over a total route distance of 160 miles. The receipts were £854,000, and the omnibus

Fig. 3.—Paris Omnibus about 1828.

Digitized by Google

miles 14,900,000. Figs. 5, 6, 7, and 8 represent types of conveyances thus operated during the period from 1855 to 1879.

The tramway section of the General Omnibus Company's business dates back to the year 1856, when a concession was transferred to the company for three lines of street railway starting from the Louvre, of which one was to reach the Rondpoint in the Bois de Boulogne. The second gave a service to Sèvres, and the third to Vincennes, a total distance

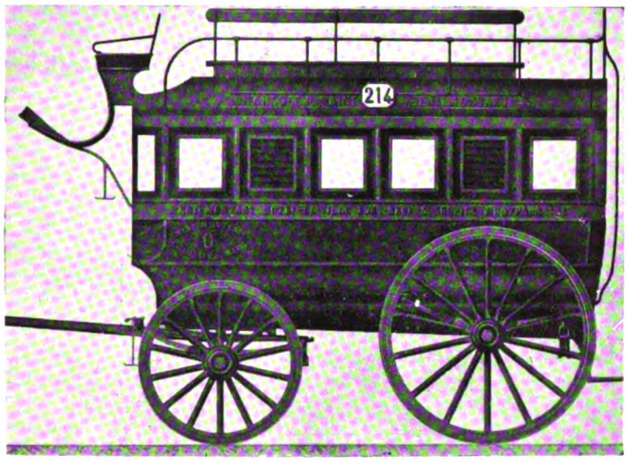


Fig. 5.—Omnibus for 24 Passengers (1855).

for the three of a little over 19 miles. Under this concession tracks from the Rondpoint and Sèvres were laid as far into Paris as the Place de la Concorde in 1858, but beyond this point it was considered by the authorities that the Imperial and other vehicles using the roadway in front of the Tuileries would be inconvenienced too much by the presence of rails in the street.

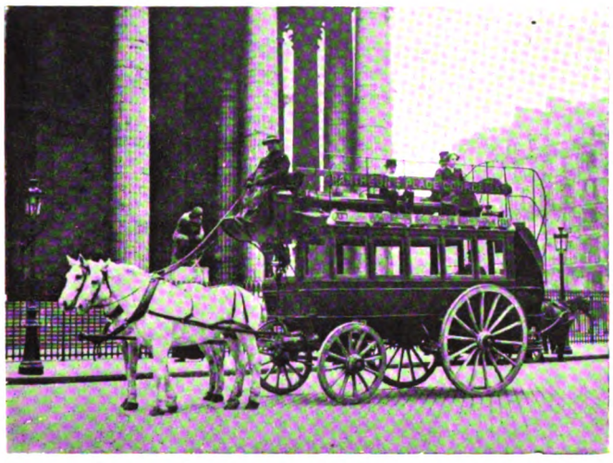


Fig. 7.—Omnibus for 30 Passengers (1866).

In 1866 the tramway vehicles were allowed to pass as far as the Palais Royal on condition that the flanged wheels were changed to flat-tired at the Place de la Concorde on the journey inwards and *vice-versa* on return. A third horse was also necessary at the same time on the "omnibus" section, owing to the increased road resistance. Some of our readers will be reminded by this of a method that was used in this country during the early seventies, by means of which ordinary horse omnibuses were able to use tramway rails through a small guiding wheel, which ran in one of the grooves and could be depressed or raised at will by the driver with a foot lever.

The first cars on these early tramways had 44 seats; succeeding types were built of capacities for 24, 40, 42, and 48 passengers. Figs. 9 and 10 are instances of the vehicles employed, with 40 and 51 seats respectively. The latter date from 1875, and were in use up to the time when animal traction was replaced by mechanical working. By the year 1900, without counting the special services established on account of the Exhibition, there were 36 tramway routes, aggregating 146 miles. The annual car mileage reached 12,750,000, and the passengers carried 155,976,000,

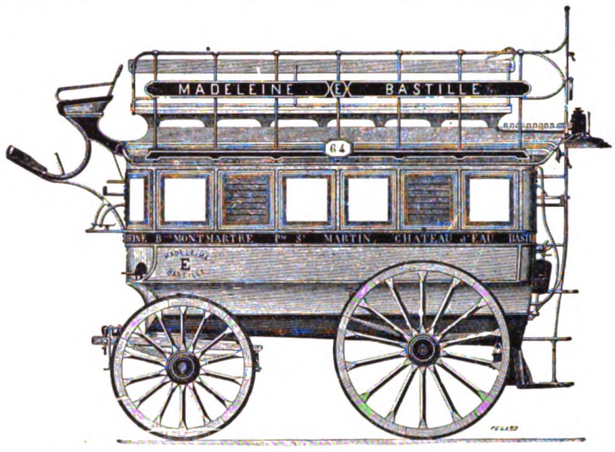


Fig. 6.—Omnibus for 26 Passengers—1866 Model.

total receipts being £1,050,000. The number of cars then in use was approximately 530. In 1909 three routes had been abandoned and two others amalgamated, leaving 32 in actual work, with an annual car mileage of 15,100,000 (passengers carried 138,451,628) and total receipts £895,000, the number of cars being 625.

The following figures relate to the year 1912:—

Fig. 8.—Three-Horsed Omnibus for 40 Passengers (1879).

Number of depots, 44; number of horses, 3,081; number of horse omnibuses, 135; number of motor omnibuses, 602; number of horse tramcars, 61; number of motor tramcars, 564; receipts, £2,045,000; staff employed, 13,094; passengers carried, 365,668,834; average receipts per passenger, 1·335d.

Delay in Electrification.—Compressed Air and Steam Experiments.

The foregoing figures show to some extent the practical results of the comprehensive conversion work then in full swing, and also indicate that it was not completed, there being still a small number of horse

Digitized by Google

cars at work. The reason for this tardy transformation must be assigned to the fact that up to 1910 the company did not know whether or no the concessions under which they were operating would be renewed. Hence the work of conversion could only be commenced in

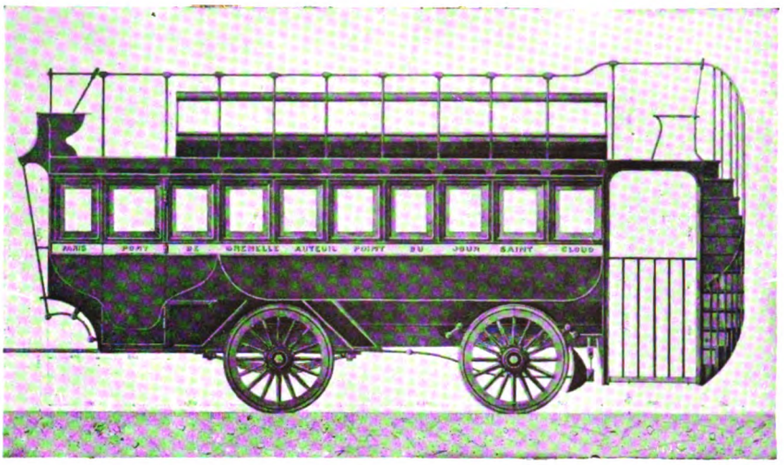


Fig. 9.—Omnibus for 40 Passengers (1866).

1911. The period embodying the twenty years between 1889 and 1910, when the concessions were definitely renewed, offers great interest owing to the number of systems of mechanical traction that were tried one after the other. At the time of the 1889 Exhibition, several Rowan steam cars were employed on special routes. An illustration of one of these is given in Fig. 11.

Although some of this type were in use up to 1910, the company had from their first experiences with steam traction no hope of its general use. The remaining short period of the concessions prevented any consideration of the electric conduit system being installed by the company, while overhead wires were out of the question.

Accordingly the company experimented with compressed air, and cars built under the Mekarski patents were put into service in 1894. Fig. 12 illustrates one of these vehicles. The practical difficulties of daily working and the high costs of compressed air locomotives forced the company into other experiments,

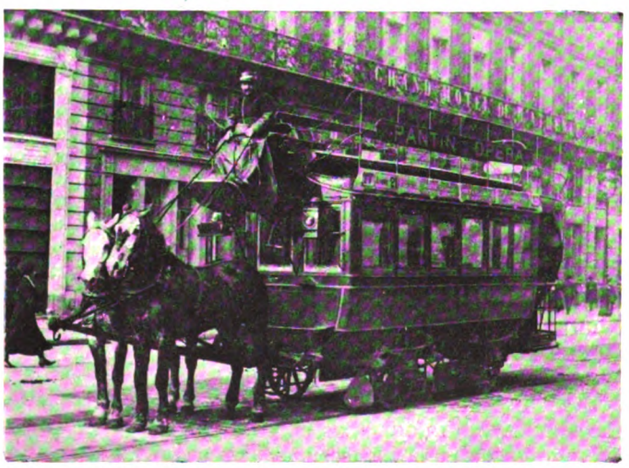


Fig. 10.—Omnibus with 51 Seats (1875).

and in 1897 they began to use Serpollet steam cars (Fig. 13). Later on these were largely replaced by steam motors of the Purrey type (Figs. 16 and 17), and meanwhile, as a means of competing satisfactorily with the Metropolitan and other tramways, where mechanical traction had been adopted from the outset, still further experiments were made with improved types of compressed air motors as well as with accumulator cars. These are illustrated in Figs. 14 and 15, both these systems being introduced about 1898.

In 1910 the concessions were renewed, and it became possible to plan a comprehensive transformation to electric working. It had taken the Ministry of Public Works and the Municipal Council from 1903 to 1910 to recognise the need for placing in the hands of one single interest the concessions for motor omnibus services, and for the new lease of the municipal tramways of Paris and of the Department of the Seine in the hands of the city of Paris. The estimates of working results on the tramways were calculated not only to give a reasonable return on the capital outlay but also an additional source of profit, which, added to the net revenue from the motor omnibuses, would justify a concurrent large capital outlay upon the latter. There was no hesitation on the part of the company in deciding at once upon electric traction with overhead wires where these were permitted, and conduits elsewhere.

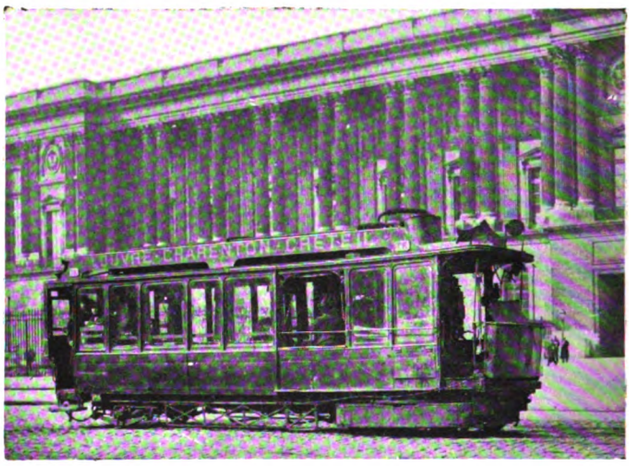


Fig. 11.—Steam Car—Rowan System—of 1889.

Routes, Depots, and Three Power Stations.

The sketch map (Fig. 20) shows the various lines forming the company's network, there being in all 34 routes with a total distance of 171·5 miles. In the plan the double lines show the portions equipped with conduit, the single lines representing the tracks where overhead wires are installed. There are 13 depots (shown on the plan by large double circles), with accommodation for over 1,300 cars (motor and trail), and at three of them are erected sub-stations in connection with the supply of electric power. The plans and specifications for all the depots were prepared by the company's engineering and other staffs, and were carried into execution under their supervision by outside contractors. The total outlay upon buildings alone has been not less than £320,000.

Fig. 19 shows the interior of one of the car-sheds at the Alfort depot, and illustrates very clearly the mode of constructing the tracks and inspection pits. One interesting feature of the design is that the gangways between tracks are lowered about 18 inches below rail level, thus helping very materially in the inspection of brakes and running gear generally.

Digitized by Google

Heavy repairs and renewals are all carried out at the central workshops, both as regards the tramcars and the motor omnibuses. This part of the installation remaining over from previous working by animal power has been greatly enlarged and increased, a total amount of a quarter of a million sterling having gone into the construction of buildings and provision of plant, tools, etc.

Power for operating the tramways is obtained from three stations, situated at St. Denis, Vitry-sur-Seine, and Billancourt. At the first-named it is generated at a pressure of 10,000 volts, and at the others at a pressure of 13,500 volts; in all cases three-phase. The situation of the power-houses and sub-stations is shown in Fig. 21, there being eight sub-stations, having a total of 23 transforming units with a capacity of 27,300 KW., and with space available for installing other 10 units for a further output of 12,350 KW. The power is transformed in the sub-stations from three-phase alternating at the pressures above-named to

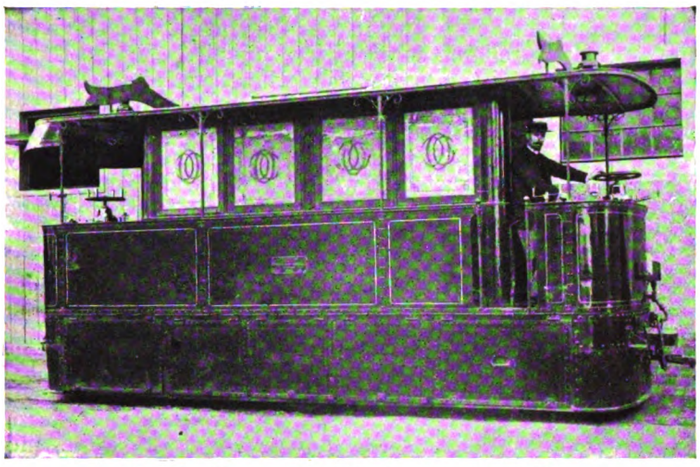


Fig. 12.—Compressed Air Locomotive (1893).

Fig. 13.—Steam Car—Serpollet System (1898).

Fig. 14.—Compressed Air Car with Trailer (1898).

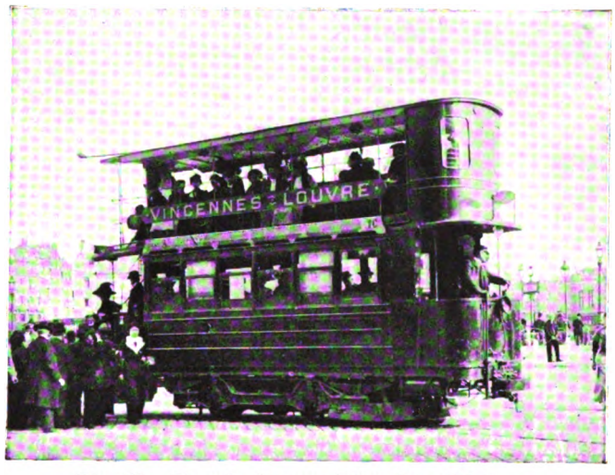


Fig. 15.—Electric Accumulator Car (1898).

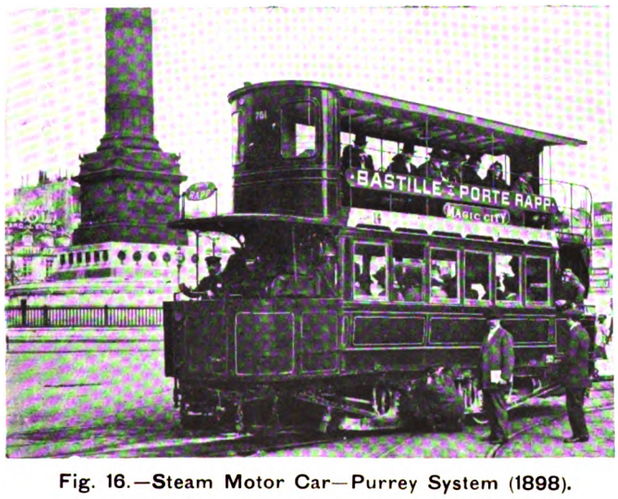


Fig. 16.—Steam Motor Car—Purrey System (1898).

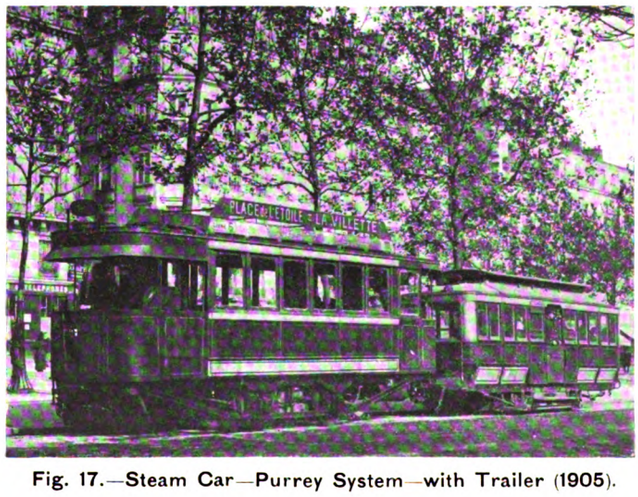


Fig. 17.—Steam Car—Purrey System—with Trailer (1905).

Digitized by Google

600 volts continuous for feeding the overhead wires and conduit contact rails.

It will be seen from the plan (Fig. 21) showing the feeders that the high tension mains follow roughly the outline of a triangle with a power-house at each angle. By this arrangement the sub-stations can be fed from the power-house on either side of the triangle, thus ensuring a continuity of supply in case of complete breakdown at any one of the three generating stations—an incident not likely to happen at two of them simultaneously. Automatic transformers or voltage compensators installed at the Dulong and Saint Martin sub-stations are used to redress the difference in high tension voltage between current supply from the St. Denis power-house (10,000 volts) and the other two (13,500 volts), when required for feeding from the former, the sub-stations usually supplied by the latter.

Fig. 18.—Steam Locomotive and Electric Trolley Car (1906).

The high tension feeders are, as stated, of three-phase design, lead-covered and armoured, the main insulation being, as usual, of specially prepared paper. Those for the working pressure of 10,000 volts have an insulation thickness of 4 mm. round each conductor, and a further thickness of 3 mm. round the triple core thus formed. The circuits for 13,500 volts have these thicknesses increased to 4·5 mm. and 3·5 mm. respectively. The lead cover is separated from the strip armouring by two layers of impregnated paper, one of cotton strip, and a layer of bitumenised hemp; this protection serves to guard the lead covering from electrolytic or chemical action due to the subsoil.

Before being laid down, the high tension feeders underwent severe tests at the works, being called on to withstand without breakdown three times the working pressure between separate conductors, also between conductors and lead covering, for a period of 15 minutes, and twice this pressure under the same conditions for the space of 30 minutes.

After installation, a further test of cables and junctions was made of double the working pressure between conductors, also between conductors and the earthed lead covering, during 30 minutes.

Watertight Junction Boxes.—Design of the Eight Sub-stations.

Particular care has been given to the accessories of the feeder system. The junction boxes are of cast-iron, and are made large enough to hold an inner box of lead in two halves, the ends of which are moulded into sleeve shape for soldering on to the lead covering of the cable. Inside the lead box the conductor ends are joined up in the usual way by clamps, and the box is then filled up with insulating material, the upper half being soldered down to the lower. Great care is then taken to fill up with resin the whole of the interior space of the outer cast-iron box, between its inner walls and the lead box, so that no part of the latter or of the lead cable covering may be put to earth through the outer cast-iron box. The whole joint becomes absolutely watertight and insulated from earth, while also giving perfectly reliable continuity of circuit. Fig. 22 shows a section of the type of junction box employed, and Fig. 23 the method of installation.

The heavy floods in Paris during the year 1910 showed that these junctions could safely be trusted to work perfectly notwithstanding the fact that they were immersed under as much as 20 ft. of water, whilst other junctions of the single box type gave way under similar conditions, putting the cables to earth as soon as it was attempted to pass current through them.

The feeders generally were laid at a depth of about 4 ft. 3 in. in a layer of sand about 4 in. thick. A layer of sand about 6 in. thick was then spread above the cable, and two separate continuous lengths of expanded metal grill between the sand and the ground surface to act as protection and warning in case of future excavation. Under roadways these metal coverings are replaced by cast-iron plates, and where the feeders cross under tramway lines worked on the trolley system and using the rails as return conductors, solid stone covers are employed for a distance of not less than 5 ft. from the track rails to prevent any possibility of return currents traversing the lead covering of the cable.

Where the normal depth of some 4 ft. 3 in. could not be secured, the cable has been carried in cemented brick conduit or covered over with cast-iron plates throughout. At points where the high tension feeders travel in the same direction as the low tensions mains, these protective works are used in common for the two; and at intervals of about five yards enamelled plates are fixed in the trenches to distinguish between the cables. The bases of these plates are coloured so as to still distinguish the cables even when the plate inscriptions may have disappeared.

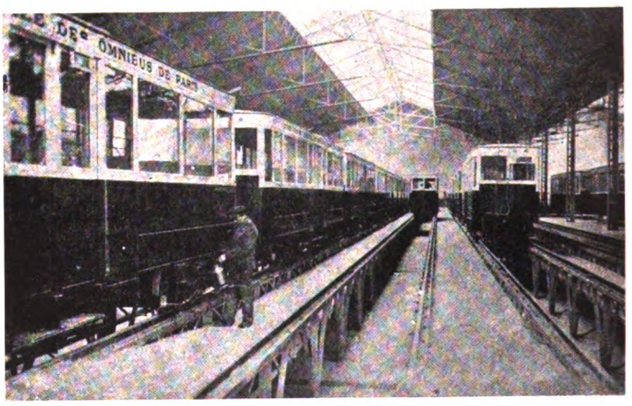


Fig. 19.—Alfort Depot, showing Inspection Pits.

The sub-stations of La Nation, Alfort, Point du Jour, and Sèvres are used exclusively for supplying the trolley wire sections of the company's system; those of La Vallee and Dulong give current for the conduit lines only, while the remaining two—Saint Martin and Alma—supply both trolley wire and conduit sections

Digitized by Google

at the same time. These stations each comprise, generally speaking, the following parts :—

(*a*) High tension switchboard ;

(*b*) Transformers reducing the alternating voltage to about 380 volts.

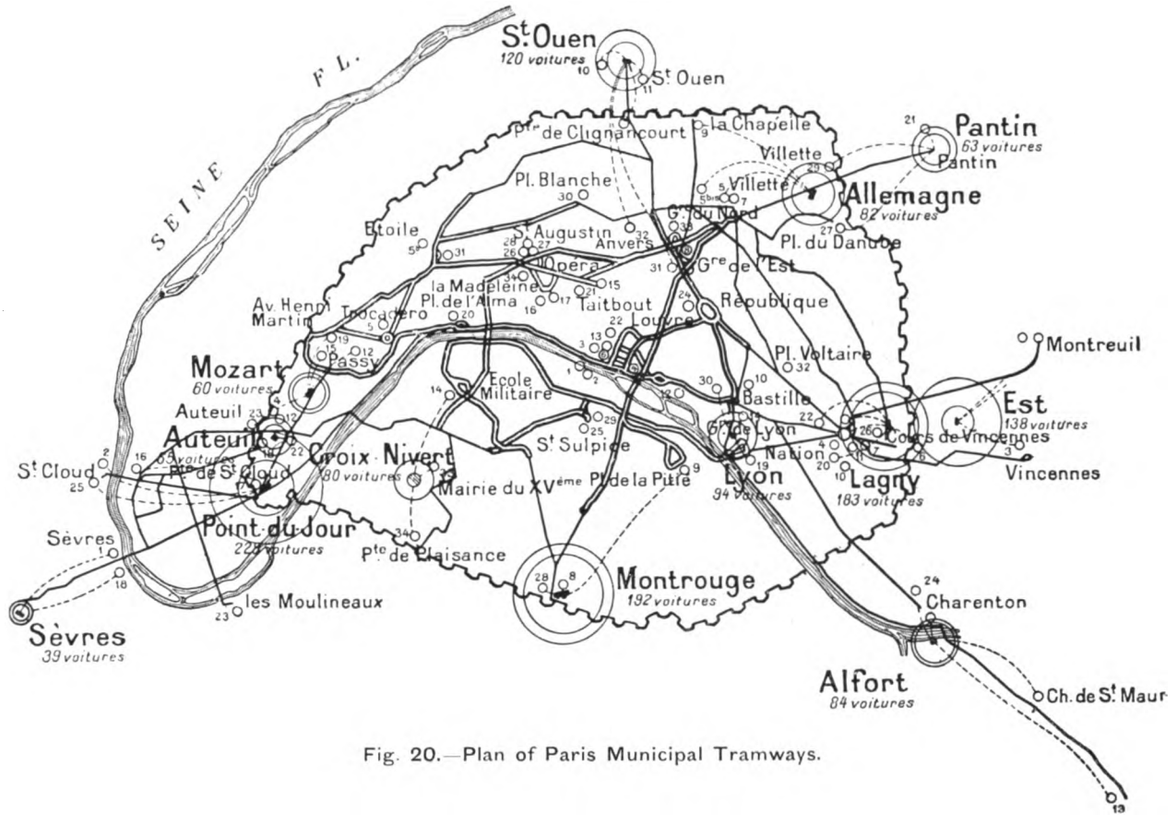


Fig. 20.—Plan of Paris Municipal Tramways.

(*c*) Motor transformers changing the alternating supply into continuous current at 600 volts.

(*d*) Low tension switchboard.

The units installed vary from 500 to 2,000 KW. capacity, but the entire arrangements at all the sub-stations are similar to one another, so that the working

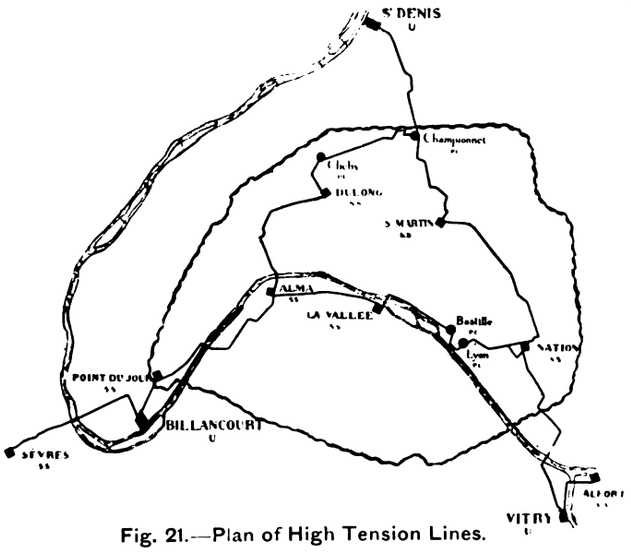


Fig. 21.—Plan of High Tension Lines.

staff has no difficulty in dealing with one or all in the same way.

The high tension switchboard includes oil circuit breakers, which are fixed on the entering ends of the high tension feeders (between the feeders and the high tension busbars), and also on the transformer circuits between the high tension busbars and the transformers. Two sets of high tension bus bars are provided for current derived from any two power-houses without it being necessary to run the power-houses in parallel ; one set is, of course, for normal working, the other for use in case of emergency.

The oil circuit breakers are operated by means of solenoids brought into action by current from a battery of accumulators in the sub-station, and their absolute automatic action is secured by means of ampere meter relays acting oppositely, and fed by transformers on the high tension circuit. The transformers are three-phase on the high tension side and six-phase on the low tension side. The windings are placed in an air-cooled oil bath, electric fans being used for circulating the air round the bath. The secondary winding is made to give, as desired, one-third or two-thirds, or full normal voltage, the connections being taken through a switch panel to alternate terminals of the motor transformers.

The latter are six-phase with plain shunt excitation, non-compounded. They are started up as asynchronous motors, the applied potential being increased progressively as above pointed out.

The low tension switchboard carries the control panels for the oil circuit breakers, both of the alternating current feeders, and the transformers, also the continuous current switch panels of the motor transformers and the feeder panels for the trolley lines and conduit circuits.

The low tension circuits include two separate sets of bus bars, so that the entire sub-station can be split up into two groups, each forming practically a distinct sub-station in itself. This arrangement is of great advantage in the case of mixed supply, that is, to trolley lines as well as conduit circuits at the same

Digitized by Google

time, since it allows them, when desired, to be separately fed. In the case of sub-stations serving one system only, this doubling of the main low tension bus bars enables the sub-station units to be separated into two groups, which can be fed by either of the two sets of high tension bus bars from either of two power-houses without putting the continuous current sets into parallel. Of course the low tension switchboard also includes all necessary automatic circuit breakers, switches, ammeters, and other registering and recording instruments of a size suitable to the heavy currents passing.

Aluminium Cables and Conductors for Small Sizes.

Distinct and separate feeders are installed for the trolley lines and for the conduit circuits. For the former positive feeders have been laid to points chosen mainly, of course, for distribution of current at minimum loss, but also with a view to fixing the feeding points as near as possible to the tramway waiting-rooms or sheds placed at numerous points throughout the network of routes, and connected by telephone with the sub-stations and depots. As far as possible, to reduce the cost of laying the feeders, both positive and negative feeders are laid in the same trench. The sections of the various positive feeders were calculated according to Kelvin's law of economic density.

Negative trolley feeders have been laid to such points as were rendered necessary by the technical conditions laid down for working lines that use a return circuit at earth potential; these conditions are embodied in an official decree, dated March 21, 1911, regarding the steps required to be taken in order to prevent the danger of electrolysis to water and gas mains, etc. An extra large number of connections are made between the negative feeders and rails in order to reduce the voltage loss in the rails and the various sections of negative feeders, so calculated that the mean fall of pressure on each feeder (measured during the peak of the daily load) between the feeding point and negative bus bar at the sub-station, should give as far as possible a uniform value. Naturally the limits of such pressure difference between these two points are fixed by applying the law affecting volts loss per mile to the return current in the rails; and to obtain the best results in the case of very short feeders, rheostats, or resistances at the sub-station are used for insertion in the feeder circuits.

Under these conditions it is believed that the average potentials measured between any two points whatever in the area fed from a sub-station, whether between rails or between the rails and neighbouring metallic conductors, such as water or gas pipes, can never reach a value capable of setting up electrolysis. The average fall of pressure on which was based the calculation of the negative feeder sections was taken at 13 to 14 volts, according to the radius of action assigned to the supply from each sub-station.

The conduit circuit feeders have been designed and laid according, generally, to the same principles as in the case of the trolley sections feeders. A notable feature of their arrangement, however, has been that for the most part their outer terminals are led into street junction pillars, in the shape of small kiosks on the footway, or installed in a tramway waiting-room. At these points are fitted polarity reversers controlling the various line sections, so that the setting up of short circuits may be avoided between the conduit contact rails (between which there is the usual potential difference of 600 volts). Should there be at any time insulation breakdowns on the contact rails of opposite polarity, the reversers can immediately be brought into use, and the defective sections put to zero pressure, the negative sections conversely receiving full voltage. This is one reason why the conduit section feeders are kept quite separate and distinct from those for the trolley sections.

The low tension feeder cables are of single core type, lead covered and armoured, and the following standard sizes were decided upon:—300 square mm., 400 square mm., 600 square mm., 800 square mm., and 1,000 square mm.

For the most part aluminium conductors are employed instead of copper in the three smaller sizes, the corresponding sections of aluminium being 510, 680, and 1,020 square mm. From the point of view of cost of conductor material, this substitution of aluminium for copper represented at market rates a saving of at least 30 per cent. for the same ohmic resistance on equal lengths, but owing to the enlarged sections and greater amount of covering required, this economy of 30 per cent. was reduced to 10 per cent. only; still it was enough to justify the use of the cheaper metal.

Furthermore, assuming equal ohmic resistance per mile, the aluminium cable has proved capable of standing at least a 14 per cent. higher limit of current intensity than copper, due to the larger diameter and surface. These cables (which, like the high tension cables, are wrapped between the lead covering and the steel armouring, with impregnated paper strip cotton strip, and asphalted hemp) were tested before

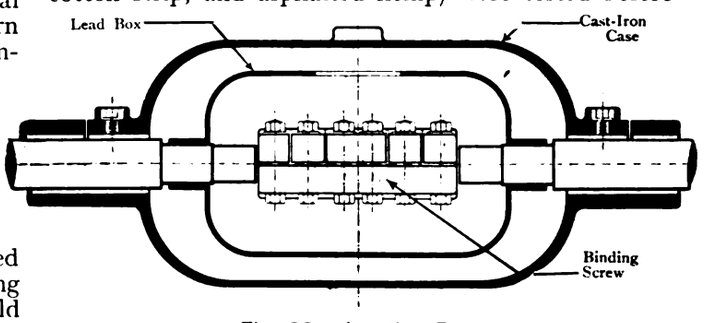


Fig. 22.—Junction Box.

leaving the works with a pressure of 3,000 volts alternating, applied for 30 minutes between core and lead covering; and after installation were again tested at 2,000 volts pressure during the same time.

The total length of trenching used for the low tension cables amounted to over thirty miles, and the length of cable used altogether to about 140 miles, considerably more than half being of aluminium. Speaking generally the method adopted of laying the cables has been much the same for low tension as for high, already dealt with, except that the depth of trench is much less, only about 2 ft. 4 in., with a layer of sand 9 in. thick, and continuous expanded metal covering as a guard and warning in the event of future excavations being made.

Feeders and Auxiliaries.—Trolley Wire Suspension.

Protection against stray currents at points where trolley lines are crossed is even more important with low tension continuous currents than with high tension alternating, and is secured as far as possible by a masonry covering to the trench for some distance on each side of the crossing.

In general the low tension trolley feeders are coupled in pairs of opposite polarity. What are called "reversing boxes," as in the case of the feeders for conduit circuits, are installed at certain points (usually under the street surface) to allow of substituting a

Digitized by Google

sound negative cable for a faulty positive one in case of emergency, and these boxes, serving thus for switching over, allow also of the detection and localisation of faults. Junction boxes, properly so-called, are placed at regular intervals where several feeders are laid in the same trench, and serve to connect up in parallel the cables of like polarity. A defective feeder section may thus be cut out while still maintaining supply to the trolley section usually fed by it.

Wherever low tension feeders pass near a tramway waiting-room they are led into it through a connection box provided with reversing switches, cutting out switches, and switches for throwing into parallel similar to those mentioned above. Feeder connections to the trolley wires are made through special boxes fitted on to the street poles, with feeder switches, telephone instrument, and other necessary accessories.

The return feeders are clamp-bonded to the rails, the bonds having a sectional area considerably greater than that of the feeders themselves.

On the conduit sections the paralleling of feeders, which is only occasionally needed in the trolley sections, becomes an absolute necessity. Similar boxes to those employed on the trolley sections are employed for the purpose. Polarity reversers are also installed in the sub-stations on the outgoing feeder terminals. The conduit section feeders are joined up to the rails usually where the conduit is enlarged for the erection of points and crossings, or in special masonry pits designed to secure absolute watertightness for the cable terminal boxes.

For the proper maintenance of the electric service, auxiliary cables forming a telephone network are laid along with the high and low tension feeders throughout. The telephone instruments are all operated by current supplied from batteries of accumulators placed in the sub-stations. Special boxes with terminals for portable instruments are put in at the points where the negative trolley feeders are connected up to the rails, and also in the low tension street boxes, provided, as already explained, with circuit breakers and reversing switches.

The total outlay on the cable and feeder installation generally has been as follows:—

High tension feeder system ..	£100,000
Sub-stations	£156,000
Low tension feeder system ..	£192,000
	£448,000

There is nothing exceptionally noteworthy in the overhead trolley wire construction where this is adopted. Outside the city proper, cross wires are used throughout, either from ordinary side poles or from rosettes on the buildings that front the line of route. Within the city boundaries bracket arm poles are the rule, embodying the standard "City of Paris" design, made uniform for all the companies operating in Paris itself. In both cases the actual poles are the same—apart from ornamentation—each pole being of the usual triple section type. The trolley wires as a rule do not run above the axes of the tracks, but in some cases on the principal thoroughfares or very wide streets are as much as 9 ft., or, in exceptional instances, even 10 ft. distant horizontally from the plane through the track centre.

The wire adopted is of figure 8 pattern, of 67 sq. mm. section inside the city boundaries and 87 sq. mm. outside the walls—with the idea of reducing the loss of pressure as much as possible as well as the need of repairs. Section insulators and overhead crossings are all built up of bronze with insulated bolts, no wood whatever being employed.

At one point of the underground conduit system, where the construction of the lines had to be postponed owing to the work of the Metropolitan Railway (Electric Underground) going on in the district, about nine miles of double track, which should have been operated by the conduit method, has had provisionally to be worked with overhead trolley, and cross wires have in this instance been allowed—the only case of the kind in the city. Large section trolley wire is used on this part of the system, meanwhile, in view of the importance and volume of the traffic.

Fig. 23.—The Making of a Cable Junction Box.—Paris Municipal Tramways.

The company's staff have carefully studied and tested in some instances the use of automatic point control, but no great use has yet been made of any of the numerous devices invented for this purpose.

Adoption of Both Side and Central Conduits.

Although no hesitation was felt as to the principle of the conduit system of traction where overhead wires were inadvisable, the exact form or design of conduit and its accessories could not be settled so easily or quickly. The whole question was gone into very carefully, the results being put before a Special Commission, which included two prominent members of the Society of Civil Engineers. That care should be taken to secure the best design is not surprising

Digitized by Google

when it is remembered that the outlay upon the conduit system by the company within the city would amount to not less than £1,600,000 for street work alone.

The conditions to be met and satisfied in conduit working may be here briefly summarised. The line insulators must be strong and well able to stand the shocks and blows from the travelling contact ploughs; their insulation must be good, since it must resist a pressure up to 600 volts; their shape must not allow mud or dirt to accumulate on them and lead to short

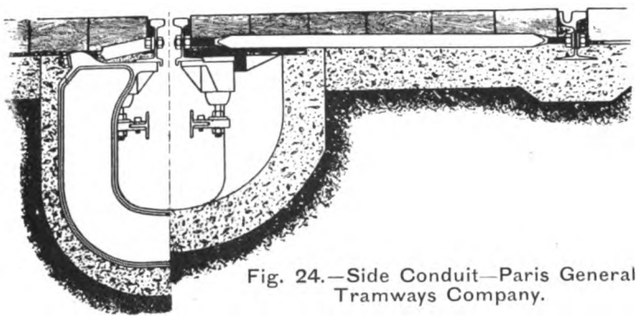


Fig. 24.—Side Conduit—Paris General Tramways Company.

circuits; finally, they must be easily replaceable in case of breakdown or damage from any cause. Then, again, the slot rail must neither be wide enough to give trouble to the ordinary street traffic nor yet so narrow that the plough stem cannot pass freely along. The conduit itself must be strongly built in order to withstand travelling weights above as well as the side thrust of the street causeway. Its depth should be sufficient to prevent any possibility of mud coming into contact with the rails, while also allowing the bottom of the conduit to be cleaned from time to time by sweeping the mud, which inevitably collects along the channel, to mudpits or sumps placed at frequent intervals with sewer connections. It was at one time proposed to construct accessible subways for drainage, inspection, and repairs, but this idea had to be abandoned, not merely on account of the expense, but also from actual want of space underground owing to sewers, gas and water mains, and other public works.

The two great systems of underground conduit are (1) those employing a central slot rail, and (2) those using one of the running rails for the slot rail, which is therefore at the side of each of the tracks instead of in the middle. So far back as 1884, tramways designed according to the first-named method were installed at Blackpool and in Cleveland (Ohio). In 1885 this principle was adopted for some of the New York lines, involving eventually the equipment of

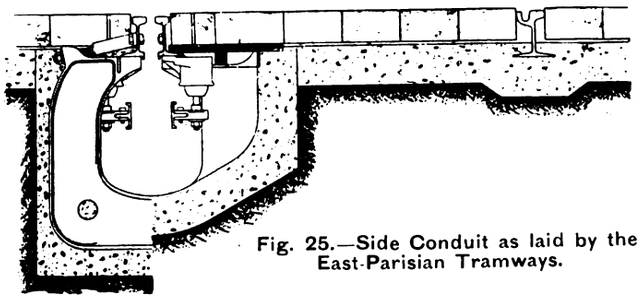


Fig. 25.—Side Conduit as laid by the East-Parisian Tramways.

about 150 miles of track; and in some other American cities conduit tramways previously operated by cable traction were converted to electric working, the original cable conduit (though small and shallow) being adapted for the purpose with more or less success. By 1898 about 12 miles of electric central conduit road had been equipped in Washington, and a small length of double track in Paris, on the Bastille-Charenton route, was also laid down by the Thomson-Houston Company, who continued the experiment of short lengths of such track in other French cities, such as Lyons, Nice, and Bordeaux.

The first side conduit track constructed appears to have been in Boston on a length of about five miles, but it was not further developed in the United States, though in Europe this principle was afterwards extensively employed at Buda Pesth, Berlin, Brussels, in Paris itself, and in Vienna. The prejudice against a side rail conduit in America is shown from a case that occurred in New York, where two companies used a section of track in common. This section was fitted for cable working, and when one of the companies converted to electro conduit working, its engineers preferred to put the conduit and slot rail between the existing central cable conduit and one of the track rails rather than use the latter for the slot rail.

Figs. 24 and 25 show respectively cross sections of the side conduits installed on the tramways of the Paris General Tramways Company, and on the Eastern Paris Tramways Company's lines. Fig. 26 gives a section and part plan of the central conduit chosen by the General Omnibus Company on reconstruction of their lines throughout the greater part of Paris. The decision, in 1903, of the London County Council to

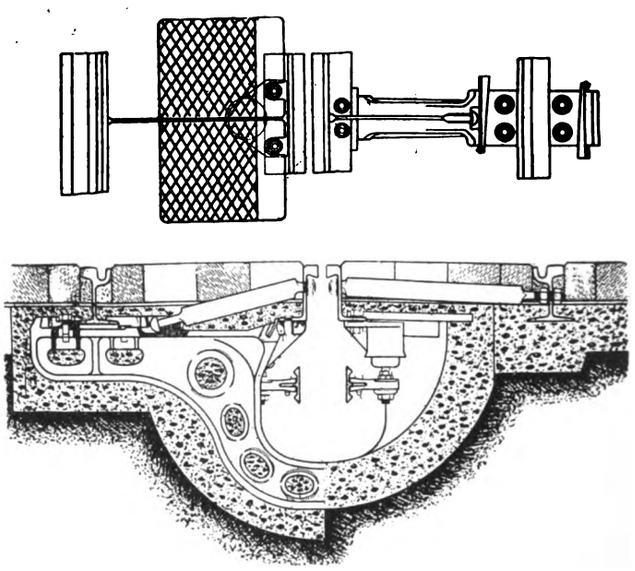


Fig. 26.—Centre Conduit—Paris General Omnibus Company.

electrify the municipal tramway and extensions led to the elaborate inquiry instituted by the Council's staff and experts into the comparative merits of central and of side conduits. The result of the inquiry was the adoption throughout of a central conduit (Fig. 1).

Some particulars of the leading features of the conduit lines above referred to are given in the following table, from which may be noted the differences between the various designs, not, it appears, of great amount or importance:—

	Washington, Central Cond.	General Paris Co., Side Cond.	Eastern Paris Co., Side Cond.	London County Council, Central Cond.	Paris General Omnibus Co., Central Cond.
	Ft. in.	Ft. in.	Ft. in.	Ft.	Ft. in.
Yoke spacing	4 7	3 5½	3 4	4	4 3
Insulator spacing ...	13 9	13 9	13 1½	15	12 9½
Weight of slot rails per yd.	66 lb.	68 lb.	70 lb.	66 lb.	63 lb.
Weight of contact rails per yd.	20 lb.	22 lb.	22 lb.	22 lb.	24½ lb.

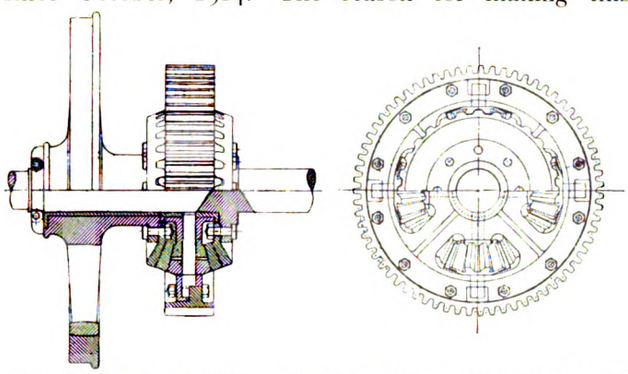
(To be continued).

Digitized by Google

DIFFERENTIAL GEARS AND RAIL CORRUGATION.

By R. H. Wilkinson, A.M.I.C.E.
(General Manager & Engineer, Huddersfield Corporation Tramways).

Having been requested to write an account of the experiment which is being made here with differential gears, I have pleasure in stating that eleven cars fitted with such gears have been in operation on this system since October, 1914. The reason for making this



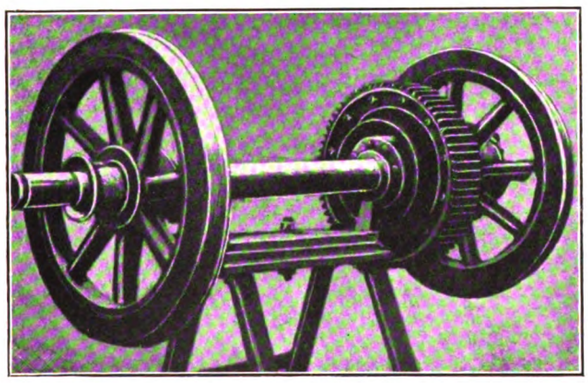
experiment was the writer's opinion that it would prevent the formation of corrugations on the rails. It is doubtful whether sufficient time has elapsed to enable a definite conclusion to be arrived at, so I will give a short account of what has so far been done.

The following alterations are necessary with the car equipment :—

(1) The axles are 6 in. longer, and have a small flange shrunk on to take one of the bevel wheels of the gear to transmit the drive through the axle to one of the car wheels. This also involves the truck being made 6 in. wider. (Otherwise the axle is quite plain with no keyway in it.)

(2) One of the car wheels is loose on the axle, the boss being a few inches longer, bushed and flanged so as to take the other bevel of the gear, thus dividing the drive between the two car wheels.

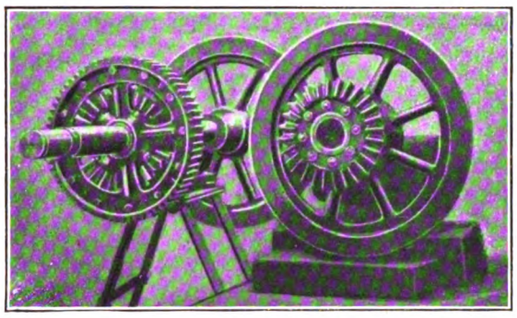
(3) The overall width of the gears being $4\frac{1}{8}$ in. greater than the ordinary type of gear, this necessitates a correspondingly wider gearcase and longer armature shaft and bearing.



These alterations, if allowed for in the design for new rolling stock, do not materially affect the cost. With regard to the differential gear itself, this costs about four times more than the ordinary gear wheel.

The route over which these cars run is six miles long, and the service is every ten minutes, maintained by cars fitted with these gears. Extra journeys are run by ordinary cars for workmen in the evenings, which I believe do not materially affect the experiment.

Previous to introducing these cars, the corrugations were ground out of the rails, and so far they have not reappeared. Outside the question of corrugation, it naturally occurs to one that there should be a reduction in wear and tear of tires and consumption of electricity due to each wheel being free to revolve independently, thus obviating the inherent slipping and skidding that takes place with the ordinary geared car wheels, especially on curves. Also these differential geared cars can coast for a longer distance and the brakes are more effective, but strange to say there is so far no



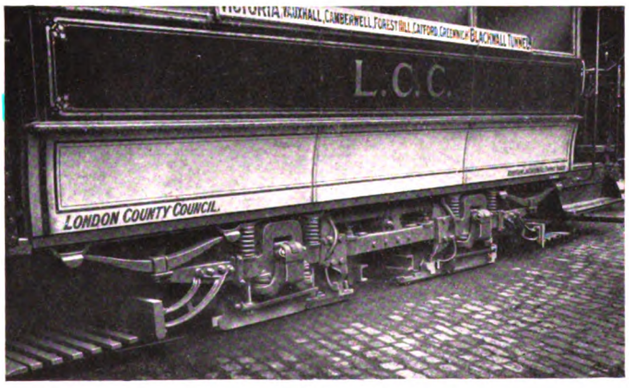
reduction in either tire wear or current consumption, so that the only advantage they appear to possess lies in the prospect of preventing the formation of corrugations.

So far, the wear in the gears is very slight, and no trouble has been experienced with them ; they promise to last many years. The rim of the gear wheel is renewable, leaving the differential portion intact. The method of construction is shown in the accompanying illustrations.

THE SPLASH GUARD FOR TRAMCARS.

The accompanying illustration shows a new type of mud or splash guard fitted to a London County Council tramcar. This form of guard, which is the invention of Mr. A. C. Adams, 6, Reddins Road, Peckham, S.E., is applicable also to automobile road vehicles. The guards on the tramcar have come through a severe test of 30,000 miles running, much of it in very bad weather.

The guard consists essentially of three metal plates. One is a main or longitudinal guard plate supported by brackets or by straps and bolts which engage with the frame or bogie of the vehicle. From this plate there is suspended by adjustable arms and links



a second guard plate which is free to swing in a forward and backward direction, and to move vertically on the outside of the main guard plate. From the swinging plate is adjustably suspended a third guard plate. The connections between the plates are such that the guards can be adjusted to the wheels as the tires wear away. The device also admits of the guard rising over any obstacle on the track. The guards are easily detached when required.

The guard not only prevents splashing, but also acts as a side life-guard on the wheels. Mr. Adams, as well as the Equipment and Engineering Company, 2 and 3, Norfolk Street, Strand, London, will be glad to give further information to inquirers.

Digitized by Google

THE
Tramway and Railway World

FOUNDED IN 1892 AND PUBLISHED BY
THE TRAMWAY AND RAILWAY WORLD PUBLISHING COMPANY, LIMITED,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

SUBSCRIPTION:

THE TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum

THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

FOR ALL PLACES ABROAD—Thirty Shillings per annum.

Single Copies—One Shilling (Postage, 2 pence—Abroad, 5 pence).

THE EDITORIAL AND PUBLISHING OFFICES OF
THE TRAMWAY AND RAILWAY WORLD
ARE AT AMBERLEY HOUSE, NORFOLK STREET,
LONDON, W.C.

Telegraphic Address: "TRAMIGRO, LONDON."
Telephone No.: GERRARD 2948.

LONDON, MAY 11, 1916.

Municipal Tramway Receipts.

The full effect of the war on the net revenue of tramways in this country as a whole has until recently remained a somewhat dubious point. The accounts of the undertakings whose financial year ended on December 31, 1915, cover, of course, a full year of war conditions, and many of them have come out of the ordeal wonderfully well. Most of the big tramway systems are, however, owned by local authorities whose financial year ends on March 31, and the year which ended on that date in 1915 covered only eight months of the war. During that period the conditions were not so stringent as they have been since. The increase in prices has been more marked during the year just ended, the scarcity of employees has become emphasised, and changes in the volume of traffic arising from conditions created by the war have had full time to make themselves felt. The question of traffic receipts in such circumstances is therefore of much interest. In order to get a proper idea on that subject, it is necessary to make a comparison with the year ended March, 1914, during which normal peace conditions prevailed. A comparison of the returns shows on the whole very reassuring results. In the cases of practically all the larger municipal undertakings the figures show substantial increases. In the districts where munition work is carried on the increases are in some cases very large. To take one or two examples, Birmingham, Bradford, Leeds, and Manchester come out very well, while in Glasgow, Newcastle, and Sheffield the increases are enormous. Leeds, Manchester and Belfast have recently published figures showing the working expenses. In the case of Leeds these are somewhat higher as compared with two years ago, but the increase is not nearly so great as that of the receipts, so that the net revenue is substantially higher. Manchester shows an actual decrease in working expenses, and the net revenue is correspondingly increased. The London County Council returns give about the same receipts as two years ago, but the period includes the time of the disastrous tramway strike in which so much money was lost. A large number of towns record traffic receipts aggregating for the year about the same as those at the end of March, 1914, and this is so in places which can hardly be called manufacturing. Only in a small minority of cases does there seem to be any material falling off as compared with the twelve months ended March, 1914. Some revenue must, of course, have been obtained from troops in training, but on the other hand, for a time at least soldiers were in many places carried free. On the revenue side therefore there is, taking the systems as a whole, ground for encouragement. As to working expenses, we must in many cases wait until the annual accounts are issued, but present indications encourage a hopeful outlook. Coal and all supplies are very dear, wages with war bonuses are high, difficulties of all sorts which cost money have had to be overcome. On the other hand, economies have been practised wherever possible, and no doubt track renewals and other expensive maintenance works have had to be postponed. Net results may accordingly be fairly favourable, and they will certainly be more favourable than might have been expected. It behoves the local authorities, which are so fortunate as to have surpluses, to conserve these with the utmost care, because when peace is restored much postponed repair and renewal work will have to be taken in hand. When that time may

Digitized by Google

come no one can determine. Future conditions must for some time remain obscure; and there never was a period when a careful and conservative financial policy was more required.

To Accelerate Loading.

A general manager has sent to us some comments upon a paragraph in a recent issue dealing with the regulation instituted at Bradford for the formation of queues at busy places, and also with the use of the near side of the front platform as a means of exit. Our correspondent expresses the fear that the queue system "can only minimise the difficulty to a limited extent, as there are busy points where it would be impracticable to attempt the formation of a queue." Although this remark is made by a manager of much experience, we would point out that many difficulties are wont to disappear in the face of a determined effort. As a case in point we would refer to what has been accomplished for half a dozen years past at Southwark Bridge, where the outward traffic in the evening is very heavy. Not one but several queues have been established, and this was done before the London County Council obtained legislative powers to enforce the order of the tramway department. These queues are worked without the erection of permanent barriers, the only structure being a few iron posts parallel with the kerb at the stopping places, and into those posts chains are threaded before the rush. Our critic agrees with the suggestion that to overcome the general difficulty of slowness of loading caused largely by departing passengers being required to "use the rear platform," an alteration is required in the design of the car of the future. In referring to the fact that certain undertakings are dealing with the matter by the use of an exit on the front platform, the correspondent observes that the plan has "some serious drawbacks, which managers must carefully consider before adopting it, viz., the greater possibility of the loss of fares by passengers being allowed to leave without having to pass the conductor, and, further, the greater liability to accident." No such grounds for criticism have been discovered in the use of those of the Huddersfield cars that have been specially constructed for exit at the fore end. Under the existing system of a rear exit a number of passengers do leave without payment while the conductor is on the top deck. With a reversal of the procedure they could be required to hand their tickets to the motorman, which would be an advantage in these days of restricted pulp imports. As to the alleged greater liability to accident, that could only arise from a division of responsibility for starting the car. That work must still remain with the conductor only, but as all passengers would alight under the eyes of the motorman one of the most fruitful sources of mishap would be done away with. These criticisms are not supported by the experience gained in the working of the single-deck cars that were recently converted to front exit operation for very heavy traffic at Newcastle, which were described and illustrated in our issue of April 13. Indeed, the innovation has proved so successful that Mr. Hatton has prepared plans for the conversion of double-deck cars to this principle of unloading. The front exit, however, is not the only method of securing rapid loading. Our issue of November 14, 1912, contained a description and illustrations of a car of novel design by which the general manager at Liverpool had overcome these drawbacks. This design gives a separate entrance and exit on the conductor's platform. Its working has been so successful that this type has been adopted as the standard car, and about fifty of such cars are now in use.

Omnibuses and the Local Veto.

The motor omnibus industry is faced with a formidable and subtle difficulty. Under Clause 20 of the Local Government (Emergency Powers) Bill, accepted by the House of Commons, the consent of the highway authority must be obtained for an omnibus service on any route where these vehicles have not been running regularly within two years of March 1, 1916. The effect of this clause is to apply the principle of the tramway veto to all new services. Anyone who has had experience of that veto will regard its extension with the utmost gravity. Neither the fact that there is an appeal to the Local Government Board (in cases where the consent of the highway authority is unreasonably withheld), nor the circumstance that the Bill is a war measure, will materially diminish the sense of gravity. The corresponding right

Digitized by Google

of appeal to the Board of Trade in connection with tramways and electricity supply has proved to be a dead letter. As for the temporary character of the Bill, there is no such thing in English legislation as a temporary precedent. Clause 20 does establish a precedent, and on the very matter in regard to which local authorities have been anxious to get control of motor omnibus services. Apart from the fact that the final clause of the Bill confers upon the Local Government Board the right to continue Clause 20 and other clauses for any period after the war, it is morally certain that the municipal influences which succeeded in getting Clause 20 inserted will not permit it to be dropped. Rather will they work to secure a similar veto over the continuance of services on existing routes. Therefore it would be folly of the most optimistic kind to regard this clause as merely an evanescent provision to protect highway authorities from incurring unnecessary expense during war time through wear and tear of roads due to omnibus extensions. Under present conditions any material development of motor omnibus services must be out of the question. Therefore Clause 20 must be treated as indicating a permanent addition to motor omnibus legislation. It must be regarded as side-tracking all the careful arrangements that have been made for determining the contribution that omnibuses ought to make to the upkeep of the roads they use. Henceforth the highway authorities will determine that contribution in the same ruthless and destructive manner as brought the tramway industry to stagnation. The fact that the principle of Clause 20 was not opposed by the London General Omnibus Company shows that the insidious character of the danger is not universally recognised. For the present, of course, the London General Omnibus Company are not seriously affected by the clause. They had carried their service to so high a stage of development before the war that it is practically immune from the effects of the veto as defined by the clause. On the other hand, not even the London General Omnibus Company can be sure of their ability to prevent the wedge from being driven home. Meanwhile the provincial motor omnibus undertakings that have recently been developing their services will find themselves subjected to the full force of municipal direction. The whole business has been sprung upon the industry so suddenly that there has been no opportunity to arrange for safeguards. But if the lesson of the tramway industry counts for anything, the motor omnibus undertakings will decline to grant more than the most reasonable concessions in buying the consent of the highway authorities for new routes. Experience proves that it is better to abandon the business than to load it with burdens that can only be carried if everything goes well. For the rest, the undertakings should use every endeavour to keep the Government to its promise that the question of the proper contributions of omnibuses to road upkeep should be dealt with after the war.

TRADE AFTER THE WAR.

The Indefatigable Mr. Hughes.

The outstanding feature of the past month in connection with trade policy after the war has been the resumption of the virile speeches of Mr. W. M. Hughes, Prime Minister of Australia. Owing to temporary indisposition he had been obliged to cancel his public engagements for a week or two, but in the latter part of the month he was again actively engaged in advocating steps to prevent the German commercial interests from ever again getting a hold in Britain or in any part of the Empire. All classes combine to do him honour. When he was entertained at dinner at the House of Commons by the representatives of British labour, on April 19, he pointed out what the Labour Government in Australia has done to put an end to German trade, and he advocated for the Empire a great national policy to secure not only national safety but the economic and social welfare of the whole body politic. The end, he affirmed, is to be obtained by organisation, and through organisation alone. In the latter days of April Mr. Hughes received from Edinburgh and Glasgow the highest civic and academic distinctions which are in their power to bestow, and in his speeches in these cities he stirred the *ingenium perfervidum Scotorum* to enthusiasm. In Glasgow in particular he insisted on the need for business organisation and for going over Britain with the harrow of resolute purpose until we have turned out by the roots every fibre of German influence that still lingers. He also urged the necessity for this country to prepare so as to be able to undertake the enormous production of wealth which will be required after the war. A suggestion, the value and importance of which will be widely recognised, was made by Lord Provost Dunlop, of Glasgow, namely, that Mr. Hughes should if possible remain in this country until the foundations are laid of the new, stronger, and better State to which Mr. Hughes points the way.

The Government Attitude.

A little clearing up of the attitude of the Government was afforded by the publication on April 20 by the Council of the Associated Chambers of Commerce of an official report of the proceedings when the deputation from the Chambers waited earlier in the month on Mr. Bonar Law, Secretary for the Colonies, and Mr. Runciman, President of the Board of Trade.

Digitized by Google

The former, while unable, pending the coming International Economic Conference and the possible settlement of a policy between the two political parties in this country and the Governments of the Dominions, to commit the Government to any definite scheme, stated that the question of fostering and safeguarding industries and the institution of tariffs will be considered by the Government from a new standpoint altogether. Three principles, he said, are agreed upon—first, that security is greater than opulence; second, that the way in which the war was brought about and carried on by the Germans will not be forgotten by future generations in this country, and that our people will never allow the Germans to exploit the markets of the Empire as they did before the war; third, that the feeling of solidarity in the Empire will make us approach the subject with a real desire to meet the wishes of the Colonies. The great point is to get agreement. Mr. Runciman also said that "we" (evidently meaning the Government) look on the future entirely from a new aspect. He desired to adopt measures which will make for defence and well-being of our people. On all which it may be said that these are excellent general principles, but everything depends on how they are worked out in practice.

The President of the Board of Trade announced on April 26 the appointment of two more committees to consider the position of certain branches of British trade after the war and to report what steps are desirable to safeguard that position. One Committee is to deal with textile industries and the other with the electrical trades. The latter, whose offices are at 7, Whitehall Gardens, London, has for its members some of the most eminent men in the business, including Sir Charles Parsons (of steam turbine fame), Mr. J. Annan Bryce, chairman of the British Westinghouse Company; Mr. T. O. Callender, of Callender's Cable Company; Mr. James Devonshire, director of a number of electric power and tramway companies; Mr. B. M. Drake, chairman of Drake and Gorham, Limited; and Sir John Snell, the well-known consulting engineer, member of the firm of Preece, Cardew, Snell and Rider, and a past president of the Institution of Electrical Engineers. Truly a strong team; let us hope Government action will back them up.

The "Beama" Activities.

Politicians and economists continue to discuss trade problems in innumerable articles in newspapers and reviews; but here we can only mention a few contributions from those associated with the electrical trades and science. The current issue of the *Beama Journal* contains a number of articles well worthy of perusal, including an editorial putting forward a proposal which is supported from other quarters. It says, dealing with the now time-honoured suggestion that there should be a Ministry of Commerce for the United Kingdom, that a completely representative National Industrial Federation would constitute the most effective Ministry of Commerce. If industrialists and business men organised a Board of Commerce, the Government would appoint members to it to represent certain State departments.

Details are given in the same journal of the publicity campaign of the British Trade Committee of the British Electrical and Allied Manufacturers' Association, the object of which campaign is to impress on the public that the defences of this country and its Allies have been based on the engineering resources of Great Britain, and that the proper utilisation of these resources after the war is the shortest road to the restoration of prosperity. A part of the campaign consists of a six months' lecture tour in which Mr. T. C. Elder is doing yeoman service. At the time of the present writing, his latest reported lecture was one before the North-East Coast Institution of Engineers and Shipbuilders. In this he pointed out that as a result of the war the capacity of British engineering works has been immensely increased. At the end of the war outlets must be found for their products, and this can only be done by the cultivation of the scientific habit and method in the economic system of the country. An association, he urged, is wanted to act as a persistent stimulus, not as a technical debating society. He looked to the manufacturers' associations for a method of pooling the experiences of members and providing the equivalent of a system of auditing for various departments. They should be assisted by a board representative of scientific and technical institutions.

In this and other directions the "Beama" is doing admirable work, and in the same connection those interested might profitably read a thoughtful and suggestive little book, "British Destiny: The Principles of Progress," by Mr. D. N. Dunlop, the secretary of the "Beama." In this there is advocated a federation of all the national forces of capital, labour, science, industry, finance, and agriculture.

Engineering and Scientific Research.

A very useful paper on this subject was presented to the Society of Engineers on May 1 by Dr. J. A. Fleming, Professor of Electrical Engineering, University College, University of London. In this the author points to the vast field for engineering work on the conclusion of the war, and to the need for more men who can do new things. The necessity for a broad and thorough scientific education is insisted on, and various lines are pointed out for practical scientific education of service for engineering and manufacturing. This involves the extension of research work, and the author urges combination among firms for research and the collection of information. The Professor condemns the multiplication of Government-appointed committees, and would prefer to see the work carried out by existing scientific and professional societies. It is essential to guard against the bureaucratisation of science. We need the scientific method of collecting the facts and drawing inferences from them to bear on the commercial problems of obtaining markets. In this connection Professor Fleming recommends perusal of Mr. Elder's addresses and Mr. Dunlop's book, which have been referred to above. Some of the Professor's closing words of wisdom are to this effect:—We have to cut ourselves adrift from all the past, its easy, self-satisfied mediocrity, dislike of trouble, and contempt for knowledge. The first steps in this seem to be a large reform in education, and the second are reforms in our system of party government. The only desirable form of government is an aristocratic one in the true and proper meaning, namely, government by the most efficient and the best. The nation will have that Government when it demands it in sufficient earnest.

So far Professor Fleming. Many of the points put forward by him and others are no doubt ideal and difficult of realisation. But the fact that there is such an uprising of opinion in the country is encouraging. The prolongation and the dubiety of the war, the added experiences of the unscrupulous and abominable character of the enemy, both in war and commerce, can only make this country the more determined to see the thing through, and thereafter to paralyse German trade aggression for ever.

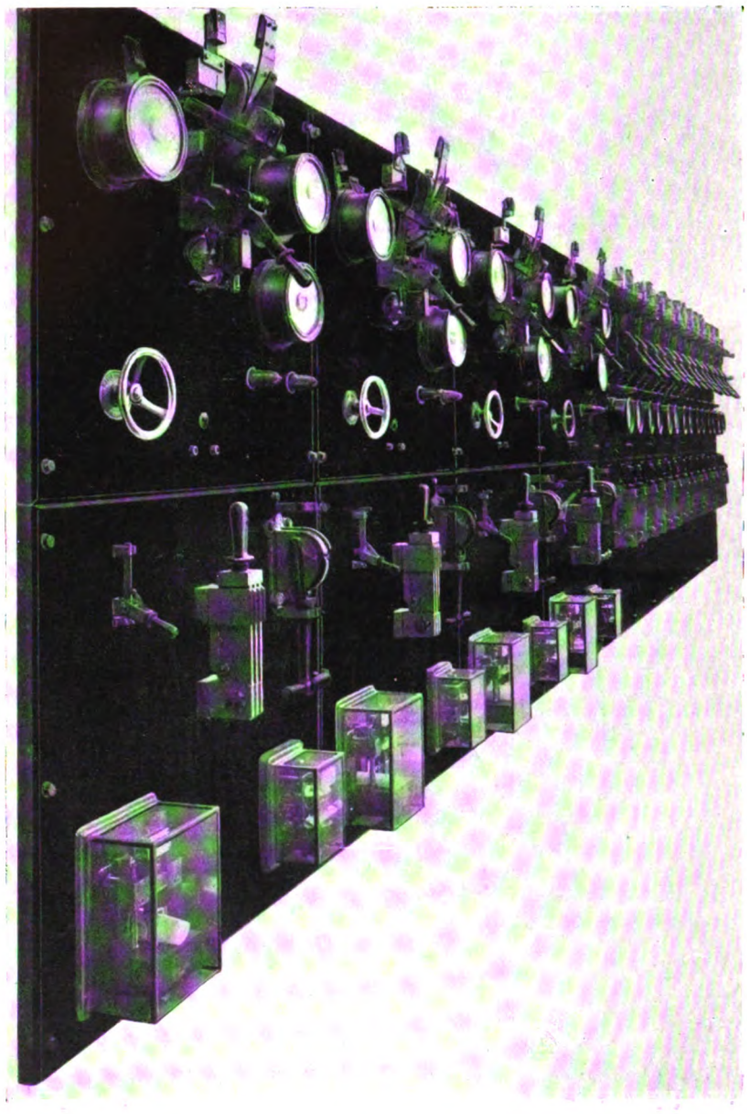
Digitized by Google

CONTINUOUS AND ALTERNATING CURRENT SWITCHGEAR.

There is probably no branch of electrical work in which the British Thomson-Houston Company have made a greater name for themselves than in the design and construction of switchgear. We are enabled here to produce three excellent views of two boards recently erected, which show clearly many of the features of the most approved forms of construction. In one illustration is indicated clearly the arrangement of the 800-volt remote-controlled D.C. traction switchboards supplied to the Central Argentine Railway Company, Limited, for use in Fernando, Olivos, and Palermo sub-stations. The cast-iron panels are supported on pipe framework, and on these are mounted the operating handles for the circuit breakers and lever switches. The latter are mounted on polished white marble slabs which are installed above the cast-iron operating panels, but sufficiently far back to give free access to the operating mechanism. Special handles are installed on the upper cast-iron panels for tripping the circuit breakers and re-setting the falling weight on the reverse current relays. These devices are actuated by Bowden wire controls. The indicating instruments, which are of the moving coil vertical edgewise type and of the flush pattern, are mounted directly behind the cast-iron panels, suitable windows being provided in front of the instrument scales. The positive busbar is carried at the back of the panels on porcelain insulators bolted to the pipe supports, whilst the negative busbar, together with the equaliser bar, are mounted on insulator supports secured to the rotary converter foundations.

The adjacent view illustrates one of the sub-station switchboards as supplied to the L. & S.W. Railway. The first four panels control the rotary converters. These panels, it will be noticed, have both the D.C. and A.C. control mounted together with the D.C. circuit breakers at the top of the panel and the A.C. oil switch operating handle on the right of the lower panel. The remaining panels are the track feeder panels. The third picture is a back view of the above panels with the heavy busbar work. The first four panels are also in this case for the rotary converters. Although not shown on the photograph, the connections of the rotary converters pass downwards from the panels. The switchboard shown is installed at the Waterloo sub-station, and the following items may be of interest :—

The total number of sub-stations on the system is nine. The switchboards have been in service approximately five months. The system is 11,000 volts 3-phase 25 cycles transformed down by means of transformers and rotary converters to 600 volts D.C. The actual rotary converters controlled by the switchgear in question consist of four 1,500-KW. machines. The British Thomson-Houston Company, Limited, have supplied to the L. & S.W. Railway fifteen 1,500 KW. and eight 1,200 KW. rotaries. A fully illustrated description of the installation of the latter company was given in our issue of November 18, 1915.

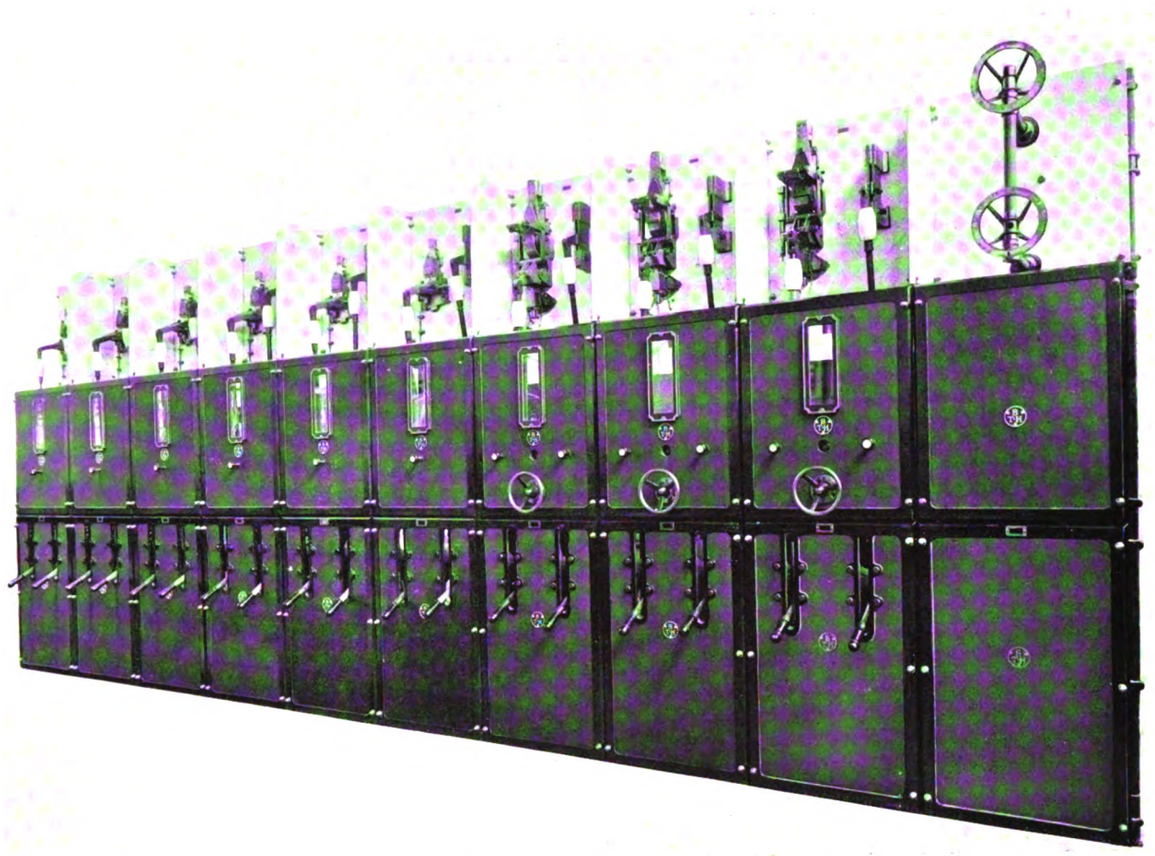


600-Volt Traction Switchboard—London and South Western Railway.

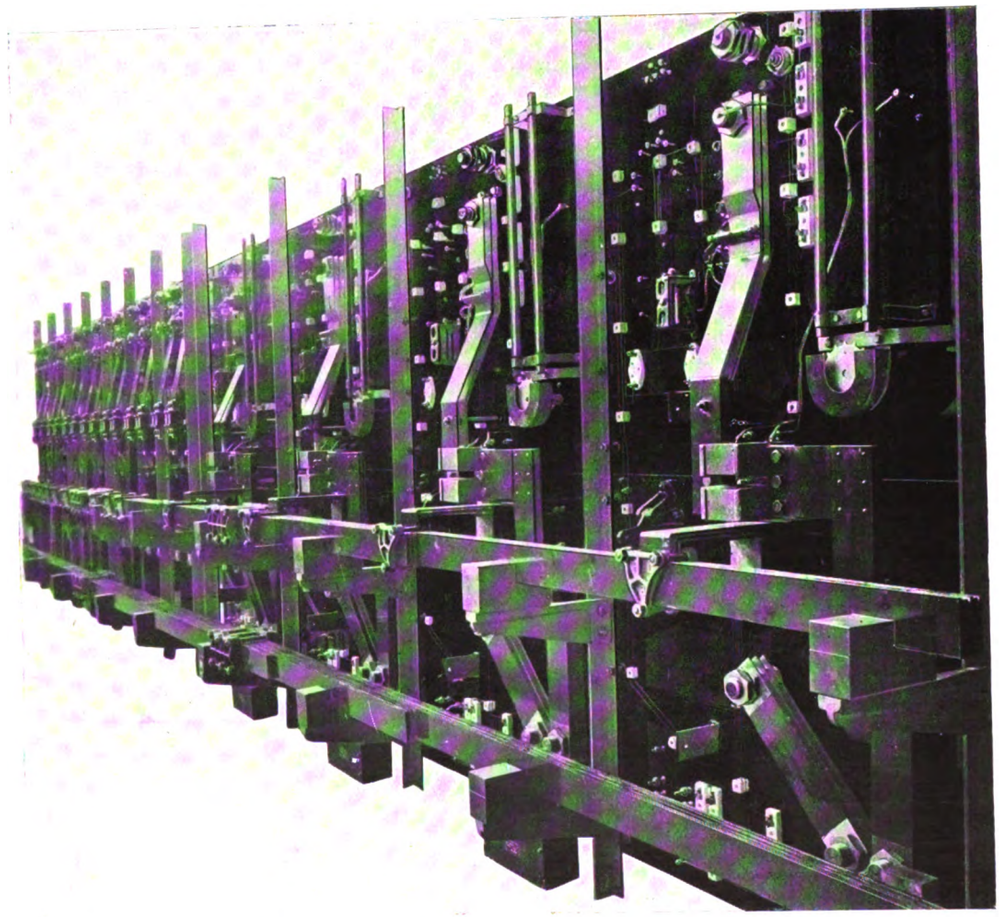
BRADFORD NOVEL GOODS CAR.

Owing to the shortage of team labour and carting facilities in Bradford, Mr. C. J. Spencer, general manager of the Corporation Tramways, has recently given renewed study to the question of utilising the tramways for the conveyance of goods. He has now obtained the sanction of the tramways committee and the Board of Trade to experiment with a combined battery and railless trolley car, the accumulators deriving their energy from the overhead wires. The battery method of traction will enable the driver to bring a load from a railway station or warehouse to the nearest tramway track and then utilise the trolley arm for travelling to any part of the city served by the tramways, the final stage of a journey being made if necessary by reverting to battery propulsion. The vehicle would run as a railless trolley car at about the same speed as a tramcar, and it could be worked without interference with the passenger traffic. It is said that the new car of the Bradford Tramways Department will accomplish the work of ten horses and carts at considerably less cost. An added advantage is that the nature of the haulage is of the kind in which a battery vehicle excels.

Digitized by Google



800-Volt D.C. Control Board—Central Argentine Railway.



Back View of 600-Volt Traction Switchboard—London and South Western Railway.

Digitized by Google

STRIKE IN THE CROYDON DISTRICT.

On the plea that the South Metropolitan Tramways Company were about to introduce women as drivers, the employees of that company left their work on April 7. According to the president of the London and Provincial Vehicle Workers' Union, the chief reason of the strike was the refusal of the company to submit the men's grievances as to pay and conditions of labour to arbitration. Two women were taken out on the cars on April 6 for preliminary instruction in driving, at the request of the Board of Trade, in order that a report might be made on their fitness or otherwise for the occupation of driving, in view of the shortage of men. On April 11 the strike spread to a number of the employees of the Croydon Corporation Tramways, but Mr. T. B. Goodyer, with the aid of a minority of loyal men, together with the clerks and several members of the Corporation, maintained a fair service of cars, particularly on the route to the London boundary. The chief demand of both sets of strikers was that the pay and conditions should be made equal to those prevailing on the London County Council Tramways. To concede this would entail an outlay of £10,000 by the Croydon authority, to meet which a 2½d. rate would have to be levied. The granting of the concession would also be followed by similar demands from other classes of workmen employed by the Council. These considerations were emphasised at a meeting of the Corporation on April 17, when the Council refused by a large majority to grant the men's request to submit the question to arbitration. On April 25 the Tramways Company assented to the arbitration proposal, and also agreed not to run cars on the Croydon lines so long as the strike in that town continued. The Corporation management proved worthy guardians of the ratepayers' interests, and have provided a service that has improved daily. A number of new men have been secured. On May 4th more than half of the cars were running. A feature of the strike has been the rebuff to the Metropolitan Police by the Croydon Borough, County, and Penge magistrates. At these three courts the police brought a great many summonses against the general managers and temporary motormen and conductors for acting without licenses. All the summonses were dismissed, the county magistrates stating that the company were acting in the interests of the community.

COAL CONSUMPTION FOR LIGHTING.

The appended communication has been forwarded by the Board of Trade to gas and electric lighting undertakings, with a request to inform their consumers that the consumption of coal for lighting purposes must be reduced by 10 per cent. :—

I am directed by the Board of Trade to state that, as you will be aware, difficulies have been experienced for some time in securing adequate supplies of coal for manufacturers of munitions and other consumers of national importance owing to the decline in the output of coal from the mines and the increase in the demand for war purposes. The position has been met in the past to a large extent by a restriction of export, but the coal which is now being exported goes largely to meet the urgent requirements of our Allies or is valuable as a weapon in negotiating with neutral countries.

The Board have observed with some concern the recent decline in coal exports, and in their opinion it has become necessary that special steps should be taken to maintain, and if possible to increase the exportable surplus of coal, and that for this purpose everything possible should be done to encourage economy in the use of fuel at the present time. The question has been further considered by the Central Coal and Coke Supply Committee, and they have recommended that a general policy of economy in lighting should be adopted, and that gas and electric lighting undertakings should be asked to do what they can to reduce consumption by a definite amount.

The Board think there can be little doubt that there are many cases in which light is at present being used needlessly, or wasted altogether. They have accordingly decided to request the owners of gas and electric lighting undertakings that they should notify to their consumers that the Government desires to see the consumption of coal for lighting purposes reduced by 10 per cent., and that they should do all in their power by notices and inspection to see that this recommendation is carried out. The Board would suggest that inspectors should be sent round as often as possible to examine meters, and hand to the consumers where necessary a notice reminding them of the recommendation, and calling attention to the fact that they have not yet carried it out. The Board would be glad to be informed in due course of the steps which are being taken in the matter.

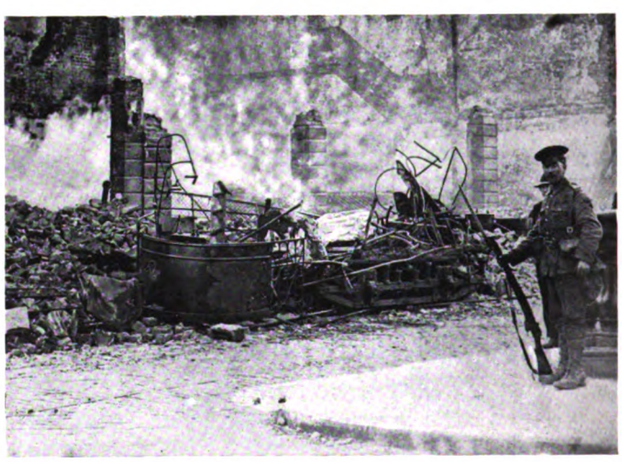
TRAMWAY SUPPLIES AND THE WAR.

With a view to securing a supply of rails during the next twelve months, the special committee of the Tramways and Light Railways Association have asked members to supply the secretary with a statement showing the minimum quantity of rails and fishplates required by them to keep their undertakings in operation. Application will be made to the Ministry of Munitions for permission to have the supplies prepared and delivered. There will be no alteration in the price for steel tires during the present quarter.

The Tramways and Light Railways Association recently made application to the Royal Commission on Paper that licences be granted to paper manufacturers so as to ensure to tramways and other bodies the full amount of their normal requirements in tickets. A reply has been received from the Commission stating that they are unable to licence a greater import on account of tramway tickets than two-thirds of the quantity of pulp imported in 1914. They add that they can see no special call for discrimination, and that there are obvious methods of economising in the production of such tickets. The council of the Association have appointed a committee to deal with the matter further, and in the meantime the council recommend that wherever possible the size of tickets should be curtailed.

DUBLIN REBELS AND THE CITY TRAMWAYS.

As a result of the insensate rebellion of the Sinn Fein organisation in Dublin which broke out on April 24, the services of the Dublin United Tramways Company were at once suspended, and it was not until May 4 that the running of the cars was resumed on some of the routes. On St. Stephen's Green the overhead wires were knocked down on Easter Monday and three cars came to a stop. The vehicles fell into the hands of the rebels, who entrenched themselves and lined the trenches with the cushions from the cars. Partly owing to the destructive tactics of the rebels and partly owing to the military operations for gaining possession of St. Stephen's Green, several cars were badly damaged. The body of one was entirely destroyed, nothing but parts of the truck and some ironwork remaining, as shown in one of our illustrations. Wherever the conspirators and their dupes took up a position, they fired on all traffic,



Remains of a Dublin Tramcar Destroyed in the Rebellion.

and tramcar after tramcar was riddled with bullets and small shot. One body of the rebels seized the power-station, and in numerous places portions of the overhead equipment were destroyed in order to render the tramways useless. The wrecked cars were still at St. Stephen's Green on May 3. One of the signatories of the "Republican Government" was an ex-tramcar motorman.

Some idea of the destruction in Sackville Street may be obtained from a comparison of the accompanying views, both taken from O'Connell Bridge at the end of Sackville Street, the centre of the Dublin tramways.

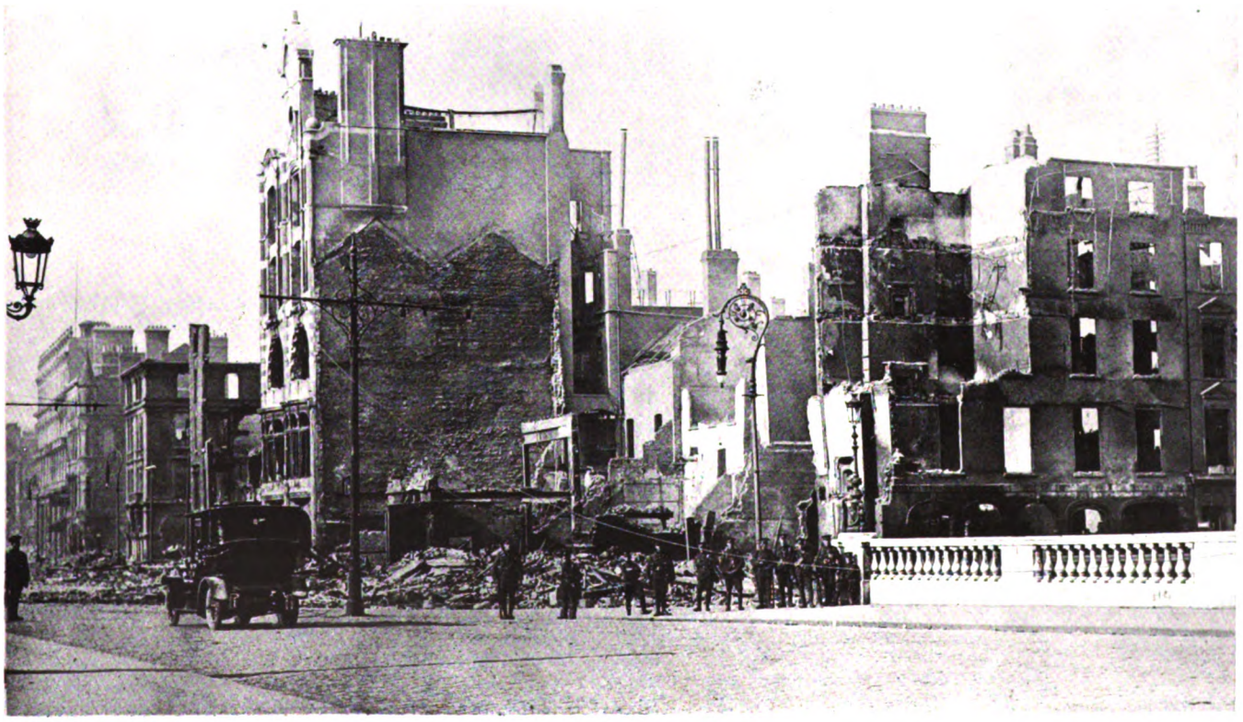
BRIGHTON OMNIBUS AND RAILLESS TROLLEY POWERS.

On account of the war Brighton Corporation have decided to apply to the Board of Trade for an extension of the time allowed in their Act for the exercise of powers relating to the proposed railless trolley installation, and for the granting of additional powers in regard to motor omnibuses. The railless trolley powers expire in 1917. The motor omnibus clause permits the operation of such vehicles on the authorised trolley routes pending the construction of the railless undertaking. Under an earlier Act of 1903 the Council had also obtained powers to run omnibuses on specified routes, but it has never been exercised. It has now been decided to apply for the amendment of the two Acts in order to acquire a general power of running omnibuses without limitation, in accordance with the present practice in the granting of motor omnibus powers. Authority is also to be sought to enable the Corporation to lease the right to run omnibuses with the consent of the Board of Trade. A similar provision is contained in the Hove Corporation Railless Trolley Act.

Digitized by Google

Sackville Street, the Centre of the Dublin Tramways, as it was before the "Rebellion."

[The O'Connell Monument is seen in the centre of the view and the portico of the Post Office is visible on the left. This building was completely gutted by fire.]



A Portion of Sackville Street, as it now appears, Looking North from O'Connell Bridge.

Digitized by Google

WOMEN DRIVERS AT GLASGOW.

The accompanying photograph is that of a group of women car drivers on the Glasgow Corporation Tramways. Mr. James Dalrymple, the general manager, informs us that it is now six months since a few women were, as an experiment, first employed as drivers, and to-day the department has 68 actually driving or under training. A few are added to the number every week.

Mr. Dalrymple adds that there is no doubt that the women are doing the work very well indeed; they have far fewer accidents than men, while the general opinion in the city is distinctly favourable. The women take their turn on all the routes exactly as the men do. With the darkening of the streets and country roads that has been instituted since the women took up the driving of cars, their work is now somewhat trying, but in spite of these unusually difficult conditions, they handle the cars very well.

Glasgow Corporation were the first to engage women to discharge the work of conductors when the ranks of the latter were depleted by the men's patriotism in joining the army, and the same enterprise has been shown by the tramways department in training the "motresses," as they are officially termed. Reference to our reports of the proceedings of the Tramways Committee during the past six months show that the male employees have been too patriotic to raise any objection to the second experiment, which Mr. Dalrymple had power to carry out on his own responsibility.

The only opposition came from the local Trades Council, but it met with no sympathy from the Tramways Committee. There are now over 1,200 women conductors, and although the supply of such sturdy women as those depicted in the photograph is limited, the necessity for increasing the number of women drivers is bound to become manifest long before the war ends. Tramway undertakings cannot escape being affected to some extent by the impending institution of compulsory military service for married men up to 41 years of age. The attitude of the Tramways Committee towards the opposition of the Trades Council may be judged from the fact that early in March they authorised the general manager to maintain the tramway service by the employment, if possible, of male drivers, but permitted him, in the event of men not being available, to engage women on the same terms and conditions. Their wages are 29s. per week. At that date Mr. Dalrymple had completed an experiment of nearly four months' duration in the work of women as drivers.

Half a dozen young women, selected from among volunteers from the conductors, were the first pupils to enter the motor school under the direction of Mr. Gardiner, at the beginning of last November. At the end of the month they had completed the term of training which male learners undergo before being placed in charge of a car. Still in their pupilage, they were then installed as drivers in a service run from Coplawhill depot. Their number was gradually increased up to 26, and early in December the original learners were each in sole charge of a car. Soon practically every route had one or more cars driven by women, and by January 31, the number of such drivers had increased to 26. The committee's recommendation was adopted by the City Council, and since then the number of women drivers has steadily grown.

Group of Women Drivers of Glasgow Corporation Tramways.

EDINBURGH CABLE TRAMWAYS.

Edinburgh Corporation have received a report from Mr. A. H. Campbell, the burgh engineer, stating that during a recent month there were 107 stoppages of the tramways. As is well known, the cable system is in use, and latterly the regular running of the cars has been very seriously interfered with, owing to causes that appear to be in dispute. The tramways are owned by the Corporation, but are leased to the Edinburgh and District Tramways, the lease expiring in June, 1919. The question of future arrangements has been receiving the attention of the Town Council, who retained Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways, to report on the subject. In the course of his report, Mr. Hamilton remarks that in view of the purchase of new cars being open to the Corporation, and the life of the cable system being probably limited, his opinion is that they would be justified in paying to the company at the end of the lease £25,000 for the 209 cars and the spare equipment. The directors of the Tramway Company would not accept less than £75,000, and the Committee regarded that as putting an end to their negotiations.

With respect to the present position, the report states that on March 2 an order, signed by the Corporation's engineer, was served on the Tramway Company and Dick, Kerr and Company, Limited—the latter being parties to the lease—requiring them to carry out necessary renewal and repair work within certain specified dates. The Committee intend to follow up these orders, with others, until all the company's obligations have been fulfilled. There are about 48 miles of cable tramway (24 street miles) and one mile of electric line. The former are laid with girder rails weighing 83 lbs. per yard, the latter with 100-lb. rails.

Councillor Harrison, convener of the Tramways Committee, on April 13, submitted to the Council a report on the tramways. The convener, in proposing its adoption, mentioned that the committee had also received from Mr. J. B. Hamilton, of Leeds, estimates of the cost for a complete new service of cable cars, and advice regarding the number of months required to supply these. It was not for the public advantage that these reports should be published at the present time.

Digitized by Google

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Year Ended.	Electric Traction Inaugurated.	System.	Line open (single track). Mls.	Line open (single track). Chs.	Borrowing Powers.	Borrowing Powers Exercised.	Unexhausted Borrowing Powers.	Total Capital Expenditure.	Capital Expenditure per Mile of Single Track.	Loans Outstanding.	Loans Repaid and Sinking Fund.	Depreciation, Renewal and Reserve Funds.	Gross Receipts. Traffic.	Gross Receipts. Other.	Gross Receipts. Total.
Aberdeen ...	*May 31, 1915	Dec., 1899	E.	27	56	415,000	366,332	48,668	366,332	13,225	184,118	234,194	189,803	86,614	1,388	88,002
Accrington ...	*Mar. 31, 1915	Aug., 1907	,,	10	53	181,925	144,570	37,355	144,570	13,729	106,831	37,739	16,891	27,510	340	27,850
Ashton-u-Lyne..	*Mar. 25, 1915	Aug., 1902	,,	8	15	130,070	111,376	18,694	111,376	13,599	66,708	36,236	3,200	22,577	343	22,920
Ayr ...	*May 15, 1915	Sept., 1901	,,	9	30	128,000	98,630	29,369	100,705	10,742	78,770	27,866	17,649	17,181	804	17,985
Birmingham ...	*Mar. 31, 1915	Jan., 1904	,,	118	71	2,858,935	2,437,104	421,831	2,472,938	20,801	1,940,158	496,946	176,726	640,091	6,923	647,014
Blackburn ...	*Mar. 25, 1916	Mar., 1899	,,	24	69	408,174	342,474	65,700	336,258	13,525	236,534	213,740	6,730	65,466	2,944	68,410
Blackpool ...	*Mar. 31, 1915	June, 1899	,,	(p)21	51	460,473	316,005	144,468	316,005	14,604	316,005	138,577	19,698	75,344	761	76,105
Bolton ...	*Mar. 31, 1915	Dec., 1899	,,	47	69	551,092	551,092	Nil	570,981	11,930	348,111	202,980	43,059	140,182	1,228	141,410
Bradford ...	*Mar. 31, 1915	July, 1898	,,	(h)118	9	1,280,788	1,043,788	237,000	1,043,054	8,831	634,618	439,321	75,208	309,320	20,568	329,888
Brighton ...	*Mar. 31, 1915	Nov., 1901	,,	17	15	378,093	279,978	98,115	280,392	16,314	211,268	69,124	7,562	54,413	2,113	56,526
Burnley ...	*Mar. 31, 1915	Dec., 1901	,,	22	18	388,052	326,077	61,975	232,580	10,465	170,852	72,664	29,550	77,161	1,306	78,467
Burton-on-Trent	*Mar. 31, 1915	Aug., 1903	,,	10	50	108,632	104,562	4,070	106,275	10,121	47,788	56,784	10,134	15,223	1,510	16,733
Bury ...	*Mar. 31, 1915	June, 1903	,,	(b)36	10	407,800	284,745	123,055	293,237	12,826	254,832	55,416	33,960	68,740	276	69,016
Chester ...	*Mar. 25, 1915	April, 1903	,,	6	35	92,991	82,380	10,611	82,934	12,883	66,977	16,059	8,072	12,935	317	13,252
Chesterfield ...	Mar. 31, 1914	Dec., 1904	,,	5	8	98,000	73,500	24,500	69,810	13,663	57,660	13,820	6,307	13,608	465	14,073
Colchester ...	*Mar. 31, 1915	July, 1904	,,	7	75	70,748	69,555	1,193	69,471	8,736	48,360	22,007	Nil.	13,413	380	13,793
Croydon ...	*Mar. 31, 1915	(q) Sept., 1901	,,	17	50	287,689	287,689	Nil	286,765	16,271	222,223	107,039	41,643	87,833	781	88,614
Darlington ...	*Mar. 31, 1915	June, 1904	,,	8	71	107,500	77,889	29,611	8,748	77,870	55,236	25,881	7,369	13,451	261	13,712
Darwen ...	*Mar. 31, 1915	Oct., 1900	,,	7	13	93,400	86,300	7,100	87,199	12,174	51,200	33,555	9,396	14,645	988	15,633
Derby ...	*Mar. 31, 1915	July, 1904	,,	22	27	...	...	...	248,373	11,113	...	74,267	(r)38,410	51,903	978	52,881
Doncaster ...	Mar. 31, 1914	June, 1902	,,	12	58	...	...	...	107,921	8,481	94,700	16,581	1,442	22,890	318	23,208
Dundee ...	*May 15, 1915	July, 1900	,,	28	32	(f)	362,789	...	371,145	13,068	266,027	96,762	92,694	66,320	1,954	68,274
East Ham ...	*Mar. 31, 1915	June, 1901	,,	14	16	192,270	191,016	254	196,309	13,824	129,336	78,806	...	59,552	680	60,232
Exeter ...	*Mar. 31, 1915	April, 1905	,,	7	0	106,000	88,818	17,182	88,818	12,688	67,966	21,360	6,420	17,964	55	18,019
Gloucester ...	*Mar. 31, 1915	April, 1904	,,	15	1	191,000	144,333	46,667	147,783	9,846	104,965	22,901	1,000	16,693	1,114	17,807
Halifax ...	*Mar. 31, 1915	June, 1898	,,	55	39	449,263	417,466	31,797	420,185	7,570	283,249	129,670	36,442	111,792	1,378	113,170
Ilford ...	*Mar. 31, 1915	Mar., 1903	,,	12	49	152,883	152,883	Nil	149,574	11,859	102,839	50,043	3,239	31,539	442	31,981
Ilkeston ...	Mar. 31, 1914	May, 1903	,,	3	56	64,214	47,000	17,214	47,833	13,436	31,462	16,422	...	6,915	171	7,086
Ipswich ...	*Mar. 31, 1915	Nov., 1903	,,	14	70	116,471	114,300	2,171	115,676	7,776	94,894	115,549	15,940	22,796	493	23,289
Keighley ...	*Mar. 31, 1915	Oct., 1904	,,	6	9	50,934	47,711	3,223	...	...	26,936	20,774	...	8,957	296	9,253
Kilmarnock ...	*May 15, 1915	Dec., 1904	,,	5	47	65,000	52,795	12,205	52,801	9,450	46,450	10,078	6,618	8,416	201	8,617
Kirkcaldy ...	*May 15, 1915	Feb., 1903	,,	8	65	213,000	97,868	115,132	97,868	11,105	76,466	21,402	5,223	16,564	412	16,976
Lancaster ...	*Mar. 31, 1915	Jan., 1903	,,	4	65	...	45,700	...	43,711	9,083	28,750	17,669	3,342	5,534	159	5,693
Leith ...	*May 15, 1915	Aug., 1905	,,	17	73	275,000	238,000	37,000	237,983	13,286	171,500	66,070	6,604	36,298	1,086	37,384
Leyton ...	*Mar. 31, 1915	Dec., 1906	,,	8	76	325,084	324,445	639	296,209	16,741	232,345	92,304	2,740	72,983	1,409	74,392
Lincoln ...	*Mar. 31, 1915	Nov., 1905	S.	2	77	98,519	44,947	53,572	44,987	15,185	40,226	12,529	(i) 692	6,435	117	6,552
Liverpool ...	Dec. 31, 1914	Nov., 1898	E.	124	0	2,622,786	2,057,850	564,936	2,062,391	16,741	1,168,685	1,177,949	366,545	684,026	13,050	697,076
Lowestoft ...	Sep. 30, 1914	July, 1903	,,	4	6	96,230	91,178	5,052	91,178	22,375	75,480	17,614	Nil	11,357	373	11,730
Maidstone ...	*Mar. 31, 1915	July, 1904	,,	7	3	82,932	82,932	Nil	79,398	11,282	63,598	19,334	...	10,402	602	11,004
Manchester ...	*Mar. 31, 1915	June, 1901	,,	203	31	2,361,038	2,207,215	153,823	2,216,009	10,895	1,648,183	548,499	438,497	887,763	14,112	901,875
Nelson ...	*Mar. 31, 1915	Feb., 1903	,,	3	69	38,000	37,885	115	37,885	9,808	28,086	9,799	...	9,300	52	9,352
Newport (Mon.) ...	*Mar. 31, 1915	April, 1903	,,	14	28	232,500	196,250	36,250	196,184	13,671	155,216	49,868	3,479	41,752	952	42,704
Nottingham ...	*Mar. 31, 1915	Jan., 1901	,,	44	20	...	...	...	733,674	16,586	473,999	261,364	56,626	176,289	3,026	179,315
Oldham ...	*Mar. 25, 1915	May, 1902	,,	28	32	506,723	446,347	60,376	453,655	15,981	303,738	166,268	2,222	111,679	2,135	113,814
				(b) 8	31											
Perth ...	May 15, 1914	Nov., 1913	,,	6	75	90,000	78,350	11,650	78,629	11,334	...	...	...	8,944	928	9,872
Plymouth ...	Mar. 31, 1914	Sept., 1899	,,	15	0	182,856	181,479	1,377	219,417	14,628	86,903	89,493	24,252	39,989	891	40,880
Pontypridd ...	*Mar. 31, 1915	Mar., 1905	,,	8	50	137,847	137,839	8	138,568	17,321	107,403	30,436	Nil	22,819	427	23,246
Rawtenstall ...	*Mar. 31, 1915	May, 1909	,,	15	71	193,290	182,172	11,118	182,276	11,709	150,324	31,848	3,051	24,460	1,076	25,536
Rochdale ...	*Mar. 31, 1915	May, 1902	,,	(i)40	2	356,991	347,782	9,209	353,200	15,407	347,782	108,034	16,000	77,660	5,742	83,402
Rotherham ...	*Mar. 31, 1915	Jan., 1903	,,	12	2	342,200	188,326	153,874	184,178	15,316	150,485	39,473	21,771	43,834	59	43,893
			R.T	...		...	...	...	...	...	...	...	...	...	...	...
Salford ...	*Mar. 31, 1915	Oct., 1901	E.	75	64	1,086,472	723,717	362,755	725,485	9,571	511,853	282,115	30,058	257,935	42	257,977
Southampton ...	*Mar. 31, 1915	Jan., 1900	,,	18	54	280,452	260,699	19,753	259,834	13,913	158,729	99,470	14,251	68,042	2,996	71,038
Southend-on-Sea	Mar. 31, 1914	July, 1901	,,	7	37	208,400	178,880	29,519	182,577	14,376	156,872	17,055	6,238	47,469	589	48,058
Southport ...	*Mar. 31, 1915	July, 1900	,,	(d) 10	63	292,000	197,730	94,270	196,178	8,424	67,250	57,870	442	19,970	450	20,420
South Shields ...	*Mar. 31, 1915	Mar., 1906	,,	10	21	251,882	184,056	67,826	181,097	17,646	155,214	37,314	30,837	39,275	570	39,845
Staly'ge, H., M., D.	*Mar. 31, 1915	May, 1904	,,	27	57	325,270	280,990	44,280	279,778	10,096	209,387	71,603	1,211	37,490	130	37,620
Stockport ...	*Mar. 31, 1915	Aug., 1901	,,	27	5	318,847	234,500	84,347	265,014	9,789	155,686	92,313	37,776	(a)65,533	1,203	66,736
Sunderland ...	*Mar. 31, 1915	Aug., 1900	,,	20	28	308,699	303,211	5,488	306,766	15,074	161,996	132,265	45,044	75,229	386	75,615
Swindon ...	Mar. 31, 1914	Sept., 1904	,,	4	42	...	...	...	44,216	9,771	33,861	11,738	7,237	8,602	309	8,911
Wallasey ...	*Mar. 31, 1915	Mar., 1902	,,	19	77	208,867	195,290	13,577	222,027	11,122	159,306	72,879	10,612	63,690	815	64,505
Walsall ...	Dec. 31, 1915	Dec., 1902	,,	19	44	279,007	188,100	90,907	189,814	9,709	148,969	72,319	36,138	39,351	940	40,291
Walthamstow ...	*Mar. 31, 1915	June, 1905	,,	13	30	198,000	194,000	4,000	190,477	14,251	168,248	25,249	...	41,346	443	41,789
Warrington ...	*Mar. 31, 1915	April, 1902	,,	9	52	103,674	102,896	778	102,128	10,583	67,028	35,869	7,977	22,631	261	22,892
West Ham ...	*Mar. 31, 1915	Feb., 1904	,,	30	4	578,478	551,588	26,890	556,878	18,532	469,051	123,888	26,236	147,703	4,509	152,212
West Hartlepool	*Mar. 31, 1915	Feb., 1904	,,	8	63	85,494	80,330	5,164	81,731	9,301	76,501	3,682	4,614	19,011	494	19,505
Wigan ...	*Mar. 31, 1915	April, 1901	,,	30	73	502,513	491,007	11,506	481,577	15,579	382,490	157,287	5,034	75,270	2,107	77,377
Wolverhampton	*Mar. 31, 1915	April, 1902	S.	21	40	279,733	268,185	11,548	292,361	13,596	209,497	71,812	53,987	54,593	730	55,323
Yarmouth (Gt.) ...	*Mar. 31, 1915	June, 1902	E.	14	58	149,600	124,750	24,850	126,453	8,588	115,700	29,148	9,613	21,872	494	22,366
York ...	*Mar. 31, 1915	Jan., 1910	,,	12	20	157,150	...	...	163,884	...	151,039	8,596	6,456	29,589	538	30,127

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast ...	*Mar. 31, 1915	Nov., 1905	E.	98	54	1,528,146	1,381,200	136,946	1,455,506	14,702	1,343,000	257,730	96,622	266,249	3,988	270,237
Bexley ...	Mar. 31, 1914	Oct., 1903	,,	6	42	100,798	98,812	1,986	98,408	15,376	75,408	23,403	942	14,698	1,649	16,346
Birkenhead	*Mar. 31, 1915	Feb., 1901	,,	24	7	378,973	373,290	5,683	373,545	15,548	228,391	143,241	23,062	65,100	685	65,785
Bournemouth ...	*Mar. 31, 1915	July, 1902	,,	(e)32	67	...	...	...	467,073	18,379	291,667	168,818	17,769	101,882	464	102,346
Cardiff ...	*Mar. 31, 1915	May, 1902	,,	31	66	832,356	787,292	45,064	811,043	25,484	485,049	302,242	98,778	139,256	36,785	176,041
Coventry ...	*Mar. 31, 1915	Jan., 1912	,,	15	61	251,014	238,355	12,659	238,803	15,151	229,235	14,363	4,095	44,633	771	45,404
Glasgow ...	*May 31, 1915	Oct., 1898	,,	198	10	4,564,266	3,694,143	870,123	3,751,708	19,127	2,411,868	1,282,275	2,326,543	1,070,694	6,184	1,076,878
				(b) 2	53											
Huddersfield ...	*Mar. 31, 1915	Feb., 1901	,,	56	4	772,662	467,142	305,520	477,919	8,526	281,927	194,599	7,522	124,200	2,859	127,059
Hull ...	*Mar. 31, 1915	July, 1899	,,	33	12	662,074	594,626	67,448	596,092	17,982	579,628	183,392	147,663	161,750	1,280	163,030
Leeds ...	*Mar. 31, 1915	Aug., 1897	,,	115	71	1,907,865	1,814,758	93,107	1,678,844	14,487	1,400,687	590,421	4,961	429,902	4,038	433,940
Leicester ...	Dec. 31, 1915	May, 1904	,,	37	76	956,363	867,944	88,419	902,073	23,770	705,985	169,554	92,797	159,678	28,842	188,520
London ...	*Mar. 31, 1915	...	H.	9	67	...	...	...	...	...	...	...	...	10,261	540	10,801
		May, 1903	C.E	274	35	(c)	(c)	(c)	13,744,806	...	9,836,187	3,786,403	565,095	2,323,130	65,916	2,389,046
N'castle-on-Tyne	*Mar. 31, 1915	Dec., 1901	E.	62	72	1,597,129	1,309,200	287,929	1,332,133	21,178	905,066	524,407	74,656	280,147	13,117	293,264
Northampton ...	*Mar. 31, 1915	July, 1904	,,	12	37	239,800	147,255	92,545	173,019	13,883	118,932	48,610	14,628	30,775	534	31,309
Portsmouth ...	*Mar. 31, 1915	Sep., 1901	,,	34	48	708,619	708,619	Nil	731,174	21,132	423,103	285,516	81,715	121,909	2,082	123,991
Preston ...	Mar. 31, 1914	June, 1904	,,	17	16	224,102	187,269	36,833	187,269	10,888	117,315	47,130	39,392	45,618	328	45,946
Reading ...	*Mar. 31, 1915	July, 1903	,,	13	14	235,000	234,000	1,000	237,102	17,996	155,419	75,406	19,471	35,608	1,074	36,682
Sheffield ...	*Mar. 25, 1915	Sep., 1899	,,	79	8	1,782,471	1,484,400	298,071	1,558,246	19,703	1,122,482	512,567	34,450	391,535	2,996	394,531
Wellington, N.Z.	Mar. 31, 1914	...	,,	31	55	496,423	496,423	...	628,151	19,821	496,423	46,836	120,191	157,096	1,161	158,257

C—Electric conduit system. E—Electric trolley system. H—Horse lines RT—Railless trolley system. S—Surface contact system.
(a) Includes £1,441 trackless. (b) Includes leased lines. (c) Conferred by Annual Money Act, which limits amount for each financial year. Powers not exercised are lapsed
(d) Not including 12 miles 40 chains leased lines. (e) Includes 7 miles 34 chains leased lines. (f) Unlimited. (h) Includes 9 miles 26 chains railless trolley routes.
(i) 17 mi. 8 chn. single track leased. (l) Including Insurance. (p) Including leased lines. (q) Corporation working commenced June, 1906. (r) Including £5,744 Accident Reserve.

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Working Expenses.					Gross Profit on Working.	Additions to Gross Profit.	Deductions from Gross Profit.						Net Surplus + or Deficit −
	Traffic.	General.	Repairs & Maintenance.	Power.	Total.			Interest.	Sinking Fund.	Income Tax.	Depreciation & Renewal	Sundries.	Total.	
Aberdeen	23,291	12,148	7,920	8,166	51,525	36,477	...	4,789	5,179	...	13,840	(i) 1,669	25,477	+ 11,000
Accrington... ...	7,213	(i)2,849	2,116	4,261	16,439	11,411	...	3,997	3,877	358	568	598	9,398	+ 2,013
Ashton-und'r-Lyne	5,215	(i)1,919	2,874	3,470	13,478	9,442	...	2,300	3,965	776	250	...	7,291	+ 2,151
Ayr	4,682	(i)2,301	1,494	2,504	10,981	7,004	...	2,487	2,310	...	...	...	7,004	...
Birmingham ...	187,946	(i)86,491	86,067	113,375	473,879	173,135	5,558	71,965	58,402	...	...	730	131,097	+ 47,596
Blackburn	17,563	(i)8,497	11,154	9,750	46,964	21,446	479	3,994	15,733	441	1,757	...	21,925	...
Blackpool	17,632	(i 7,755	9,239	10,225	44,851	31,254	...	(h)9,878	7,640	...	...	...	17,518	+ 13,736
Bolton	30,044	(q)9,486	15,912	20,689	76,131	65,279	857	(h)10,525	17,520	1,713	18,339	(i)981	49,078	+ 17,058
Bradford	91,597	(i)36,890	64,670	52,938	246,098	83,793	4,525	22,087	24,164	5,422	7,832	4,203	63,708	+ 24,610
Brighton	14,152	(i)6,759	13,690	8,384	42,985	13,541	55	7,661	5,917	...	...	...	13,578	+ 18
Burnley	21,142	(i)10,079	9,141	17,955	58,317	20,150	...	6,796	8,284	1,515	...	(f)1,890	18,486	+ 1,664
Burton-on-Trent...	5,609	(i) 1,821	2,686	3,086	13,202	3,531	24	1,266	1,451	...	...	...	2,717	+ 838
Bury	16,129	4,971	7,162	7,504	35,766	33,250	303	(h)7,037	6,026	825	2,472	(w)11,193	27,553	+ 6,000
Chester	3,304	(i)1,834	1,318	2,256	8,712	4,540	130	(h)2,748	1,018	...	904	...	4,670	...
Chesterfield ...	3,214	1,368	2,936	2,192	9,710	4,363	269	2,275	1,900	...	...	...	4,175	+ 457
Colchester	3,045	1,372	2,370	2,783	9,570	4,223	28	(h)1,986	2,496	...	...	(i)172	4,654	− 403
Croydon	31,319	(i)9,151	14,128	17,684	72,282	16,332	749	7,889	7,415	1,587	...	...	16,891	+ 190
Darlington... ...	4,273	896	1,895	2,103	9,167	4,545	160	1,926	2,006	101	1,202	...	5,235	− 530
Darwen	4,064	1,146	3,260	2,653	11,123	4,510	222	2,221	2,190	...	1,050	...	5,461	− 729
Derby	18,514	(i)3,502	6,926	8,941	37,883	14,998	199	6,152	3,568	§ 12	5,432	(l) 141	15,305	− 108
Doncaster	4,969	1,342	6,550	4,166	17,027	6,181	16	2,935	1,840	138	572	58	5,543	+ 654
Dundee	17,829	(i)7,398	7,445	10,686	43,358	24,916	...	8,990	6,700	323	7,842	...	23,855	+ 1,061
East Ham	19,381	6,796	14,558	10,884	51,619	8,613	...	5,279	6,858	...	...	...	12,137	− 3,524
Exeter	4,793	1,535	1,715	3,556	11,599	6,420	...	(h) 2,241	1,950	120	...	...	4,311	+ 2,109
Gloucester	7,250	1,643	2,975	1,836	13,704	4,103	...	(h)5,362	1,881	370	...	...	7,613	− 3,510
Halifax	30,501	7,877	13,529	21,597	73,504	39,321	345	10,424	12,106	...	(y)925	(i)2,632	23,455	+ 16,211
Ilford	10,444	3,518	4,171	5,387	23,520	8,461	557	3,786	5,252	...	...	...	9,038	− 20
Ilkeston	2,262	789	1,378	1,460	5,889	1,197	160	1,450	1,532	90	...	96	3,168	− 1,811
Ipswich	8,801	1,962	5,033	3,494	19,290	3,999	(u) 4,877	(h)3,660	2,207	...	3,421	(i) 237	9,525	− 649
Keighley	3,129	729	1,210	1,676	6,744	2,509	190	935	1,876	...	...	...	2,811	− 112
Kilmarnock ...	2,995	(i)801	1,434	1,636	6,866	1,751	5	(h)1,863	1,110	...	1,160	...	4,133	− 2,377
Kirkcaldy	4,811	1,416	2,312	2,912	11,451	5,525	68	2,604	2,411	...	409	136	5,560	+ 33
Lancaster	2,207	(i)617	879	1,615	5,318	375	52	942	1,250	...	...	...	2,192	− 1,765
Leith	9,979	3,455	5,148	4,215	22,797	14,587	2,264	(h)6,029	7,850	...	3,252	150	17,281	− 430
Leyton	23,074	10,711	14,202	13,152	61,139	13,253	...	17,968	37	...	...	..	18,005	− 4,752*
Lincoln	1,446	656	967	872	3,941	2,611	47	1,529	1,071	...	...	(i) 6	2,606	+ 52
Liverpool	192,352	69,830	83,100	123,527	468,809	228,267	25,231	50,082	63,726	...	(d)34,821	(e) 4,869	153,498	+100,000
Lowestoft	3,405	655	1,552	2,323	7,935	3,795	..	2,441	2,251	...	...	...	4,692	− 897
Maidstone	2,584	1,152	2,052	1,771	7,559	3,445	56	2,473	1,976	...	...	...	4,449	− 948
Manchester ...	273,002	(i)117,573	85,280	128,350	604,205	297,670	14,615	(h)58,243	57,599	13,790	48,584	(r)34,069	212,285	+100,000
Nelson	2,390	798	1,717	1,982	6,887	2,465	...	958	1,059	...	...	314	2,331	+ 134
Newport (Mon.) ...	10,429	4,234	9,655	6,638	30,956	11,748	857	5,694	4,357	...	1,886	(i) 668	12,605	...
Nottingham ...	48,272	14,674	17,408	30,692	111,046	68,269	...	16,444	21,121	...	...	(i) 2,040	39,605	+ 28,664
Oldham	27,159	10,158	28,025	19,742	85,084	28,730	1,639	16,158	11,734	2,347	...	(g) 5,799	36,038	− 5,669
Perth...	...	...	...	...	6,002	3,870	...	...	...	...	...	...	...	...
Plymouth	8,430	3,896	4,514	8,026	24,866	16,014	1,257	4,282	3,141	690	5,121	...	13,234	+ 4,037
Pontypridd ...	5,194	1,363	6,831	3,291	16,670	6,575	...	3,761	3,791	...	665	252	8,469	− 1,889
Rawtenstall ...	6,126	2,446	3,187	4,273	16,032	9,504	85	5,483	6,493	...	...	...	11,976	− 2,387
Rochdale	19,308	5,063	10,984	11,537	46,892	36,510	1,636	11,478	9,594	2,038	...	(i)(z)10,752	33,852	+ 4,284
Rotherham... ...	E 11,039	4,071	5,864	8,718	29,692	14,201	195	5,349	3,465	...	4,082	...	12,896	+ 1,500
	RT ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salford	75,579	(i)24,562	27,778	48,819	176,748	81,229	4,477	15,791	668	4,112	492	(k)29,378	51,441	+ 34,265
Southampton ...	21,466	(i) 6,862	9,433	12,545	50,306	20,732	(t)6,757	7,564	7,557	952	5,000	...	21,073	+ 6,416
Southend-on-Sea	10,109	3,124	6,057	8,656	27,947	20,111	610	(h) 5,604	2,772	...	...	..	8,376	+ 12,346
Southport	4,922	(i)2,406	2,765	3,015	13,108	7,312	6,249	6,549	5,018	...	2,120	...	13,687	− 126
South Shields ...	9,249	(i)5,225	4,156	6,880	25,510	14,335	140	5,230	3,651	...	...	...	8,881	+ 5,594
Staly'dge,H.,M.,D.	12,818	(i)5,022	7,448	5,761	32,049	5,571	...	7,485	7,786	...	400	397	16,068	− 10,497
Stockport	15,630	5,817	10,718	4,683	36,848	29,886	2,260	5,240	10,008	1,586	3,134	2,790	22,758	+ 9,837
Sunderland ...	19,807	5,608	4,867	11,267	41,549	34,066	265	(h) 6,464	10,374	1,218	10,875	400	29,331	+ 5,000
Swindon	2,854	828	1,534	1,850	7,066	1,845	45	1,215	1,422	...	...	...	2,637	− 747
Wallasey	18,736	(i) 6,704	6,213	10,801	42,454	22,051	1,249	5,520	5,072	...	...	634	11,226	+ 12,074
Walsall	8,744	3,671	4,582	5,958	22,955	17,336	1,279	4,826	4,088	1,000	...	(i) 855	10,769	+ 7,846
Walthamstow ...	14,417	2,972	8,845	8,546	34,780	7,009	30	(h)6,427	3,468	...	...	(i) 712	10,607	− 3,568
Warrington ...	6,135	(i)2,556	2,996	3,323	15,010	7,882	481	2,418	3,447	...	...	...	5,865	+ 2,498
West Ham	52,659	†14,531	33,326	19,420	119,936	32,276	243	18,875	12,679	...	692	...	32,246	+ 273
West Hartlepool	4,791	1,586	2,956	2,241	11,574	7,931	3	2,569	1,847	...	..	(f) 500	4,916	+ 3,018
Wigan	17,340	5,252	12,768	10,817	46,177	31,200	331	(h)13,866	13,101	...	...	3,662	30,629	+ 902
Wolverhampton ...	13,031	(i)6,239	8,594	7,202	35,066	20,257	(x) 2,535	7,760	5,669	203	5,416	...	19,048	+ 3,744
Yarmouth (Gt.) ...	7,397	(i)1,989	2,833	4,441	16,660	5,706	40	(h) 4,158	2,883	...	...	...	7,041	− 1,295
York	9,958	(i)2,908	2,785	6,004	21,655	8,472	...	(h)5,176	2,084	...	...	...	7,260	+ 1,212

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast	75,752	17,245	35,294	28,622	156,913	113,325	...	48,342	31,277	1,478	17,879	2,164	101,140	+ 12,185
Bexley	3,282	1,382	*3,554	828	(s) 11,630	4,716	...	2,794	2,509	...	324	...	5,627	− 911
Birkenhead ...	15,923	(i)5,621	12,124	5,839	39,507	26,278	...	(h)11,340	9,760	527	3,500	151	25,278	+ 1,000
Bournemouth ...	22,933	7,998	9,095	15,040	55,066	47,280	955	(h)10,587	16,535	...	...	(i)12,166	39,288	+ 8,947
Cardiff	43,914	11,332	26,879	26,593	108,718	67,323	1,123	23,925	22,645	2,272	6,947	2,655	58,444	+ 10,002
Coventry	13,626	4,333	9,005	3,564	30,528	14,876	137	8,521	5,755	...	...	(i)634	14,910	+ 103
Glasgow	345,625	(i)193,837	144,530	51,995	735,987	340,891	65,826	78,797	105,492	22,790	172,310	14,377	393,766	+ 12,951
Huddersfield ...	33,571	(i)7,911	20,449	12,047	73,978	53,081	...	(h)12,536	13,061	2,274	15,575	1,235	44,681	+ 8,400
Hull	(i)58,137	12,634	31,909	11,622	114,302	48,728	...	16,578	13,883	576	3,117	...	34,154	+ 14,574
Leeds	115,601	40,347	43,609	28,577	228,134	205,805	7,837	47,174	57,773	7,356	11,928	(i)7,844	132,075	+ 81,567
Leicester	58,328	11,980	20,522	31,312	122,142	66,378	365	21,588	21,287	4,484	1,204	(i)7,413	55,976	+ 10,757
London	H. 4,737	1,859	3,878	(m) 5,854	16,328	def. 5,527	...	330,301	405,605	32,102	1,541	(h)15,851	785,400	− 33,172
	E.793,481	(r) 276,574	364,064	250,124	1,684,243	704,803	47,425							
N'castle-on-Tyne...	79,328	25,580	31,120	24,430	160,458	132,806	3,197	(h)29,574	43,356	5,411	68	(i)13,837	92,246	+ 43,757
Northampton ...	8,428	3,187	3,103	6,136	20,854	10,455	473	(h) 3,900	4,624	441	90	(ib)1,221	10,276	+ 652
Portsmouth ...	31,414	(i)13,293	8,371	5,580	58,658	65,333	(a)11,483	21,643	18,455	1,941	11,677	532	54,248	+ 22,568
Preston	12,350	4,989	9,252	2,995	29,586	16,360	...	3,625	5,038	..	...	1,356	10,019	+ 6,341
Reading	8,324	(i)4,356	4,313	3,643	20,654	16,028	11	6,709	5,062	263	...	...	12,034	+ 4,005
Sheffield	120,296	(i)31,784	45,385	49,365	246,830	147,701	2,056	31,747	42,504	5,567	30,017	8,014	117,849	+ 31,908
Wellington, N.Z....	57,973	7,775	21,918	17,947	105,613	52,644	2,091	19,865	4,757	...	14,682	...	39,304	+ 15,431

(a) Includes £10,703 balance forward from previous year. (b) Includes £152 loss on omnibus account less profit on parcel service. (c) Includes £1,611 insurance fund. (d) Includes reserve. (e) Includes rents for leased lines. (f) Rent of leased lines. (g) Rent of lines and deficit on motor omnibus account. (h) Including income tax. (i) Includes Army Service Allowance. (j) Includes £692 deficit on railless traction. (k) Includes rents of lines. (l) Including loss on horse traction. (m) Horsing expenses. (n) Transferred to motor omnibus capital account. (o) Includes £1,337 through-running contributions. (p) Includes £407 horse account. (q) Includes National Insurance. (r) Including special charges. (s) Includes £2,584 through-running contributions to L.C.C. (t) Includes balance forward from previous year. (u) From borough fund. (w) Amount apportioned to leased lines. (x) Includes £1,554 profit on motor char-a-banc. (y) Parliamentary Expenses. (z) Includes £6,519 rent of leased lines. * Includes £1,913 spent on renewals. † Under a resolution of the Council, the allowances to employees serving with the Forces, amounting to £6,031, are defrayed out of rates and therefore not included in these accounts. § £2,950 profit from 3 months' working.

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Appropriation of Net Surplus.			Receipts per Car Mile.		Operating Expenses per Car Mile.					Percentage of Operating Expenses to Total Revenue.	Average Operating Expenses per Car Mile (excludi'g Power Cost).	Board of Trade Units.		
	Carried Forward.	Reserve.	Contribution to Rates or Municip'l Funds.	Average Total per Car Mile. d.	Average Traffic per Car Mile. d.	Traffic. d.	General. d.	Repairs and Maintenance. d.	Power. (Price paid) d.	Total. d.	%	d.	Units.	Cost per Unit. d.	Units used per car mile.
Aberdeen ...	...	7,590	3,410	11·06	10·89	2·93	1·53	·99	1·03	6·48	58·54	5·45	2,317,204	·845	1·027
Accrington ...	...	...	2,013	12·20	12·05	3·16	1·24	·93	1·87	7·20	59	5·33	831,933	1·23	1·51
Ashton-u-Lyne	41	...	2,110	11·529	11·356	2·623	(e) ·965	1·446	1·745	6·779	58·80	5·034	659,302	1·125	1·382
Ayr...	...	...	...	9·61	9·18	2·50	1·25	·79	1·33	5·87	63	4·47	442,969	1·28	·98
Birmingham ...	30,000	17,596	...	10·910	10·793	3·169	1·459	1·451	1·912	7·991	73	6.079	24,186,574	1·125	1·7
Blackburn ...	...	...	...	14·20	13·59	3·64	1·76	2·32	2·02	9·74	68·65	7·72	1,678,976	1·38	1·53
Blackpool ...	...	1,736	12,000	16·82	16·65	3·90	1·71	2·04	2·26	9·91	58·93	7·65	1,552,635	1·58	1·43
Bolton	58	...	17,000	11·758	11·656	2·498	·788	1·323	1·721	6·330	53·836	4·610	4,514,010	1·1	1·56
Bradford	...	14,610	10,000	12·425	11·816	3·457	1·041	2·450	2·027	8·975	74·60	6·948	12,272,121	1	1·926
Brighton	18	...	...	12·240	11·782	3·064	1·464	2·964	1·816	9·308	72·79	7·10	1,676,770	1·2	1·51
Burnley	...	...	1,664	11·450	11·259	3·085	1·108	1·334	2·620	8·147	71·16	5·53	3,621,567	1·15	2·20
Burton-on-Trent	838	...	...	9·13	8·30	3·06	·99	1·47	1·68	7·20	78·5	5·28	530,080	1·39	1·04
Bury	...	(k)1,000	5,000	10·26	10·22	2·399	·776	1·253	1·268	5·696	51·82	4·428	2,045,692	1·25	1·26
Chester	...	...	...	9·16	8·94	2·28	1·27	·92	1·56	6·03	66	4·39	414,118	1·33	1·19
Chesterfield ...	...	457	...	11·1	10·8	2·54	1·08	2·31	1·73	7·66	68·9	5·93	420,824	1·25	1·38
Colchester ...	...	...	...	9·942	9·668	2·194	·989	1·709	2·006	6·898	69·24	4·892	445,214	1·5	1·34
Croydon	...	190	...	7·593	7·526	2·683	·784	1·211	1·516	6·194	78·68	4·493	3,000,308	1·416	1·071
Darlington ...	...	...	...	8·487	8·326	2·645	·554	1·172	1·304	5·675	66·85	4·371	504,546	1	1·301
Darwen	...	...	...	14·02	13·13	3·65	1·03	2·93	2·38	9·99	71·15	7·61	485,033	1·312	1·812
Derby	...	...	...	10·233	10·426	3·650	·691	1·365	1·763	7·469	71·6	5·706	1,479,947	1·45	1·216
Doncaster ...	...	654	...	10·52	10·37	2·24	·61	2·97	1·90	7·72	73·1	5·82	799,965	1·25	1·51
Dundee	...	61	1,000	11·802	11·465	3·082	1·278	1·288	1·847	7·495	63·5	5·648	2,564,659	1	1·847
East Ham ...	..	...	...	9·05	8·95	2·91	1·02	2·19	1·63	7·75	85·70	6·12	2,461.677	1·062	1·54
Exeter	...	2,109	...	9·629	9·60	2·560	·821	·917	1·900	6·198	64·37	4·298	615,956	1·375	1·38
Gloucester ...	...	...	...	6·84	6·41	2·78	·63	1·14	·71	5·26	77	4·55	470,336	1	·70
Halifax	...	(r) 7,483	(s)6,171	11·657	11·514	3·141	·812	1·393	2·225	7·571	65	5·35	4,607,293	1·125	1·98
Ilford	...	...	...	8·127	8·006	2·846	·729	1·164	1·109	5·848	73·6	4·60	1,131,616	1·125	1·172
Ilkeston	...	...	...	7·04	6·87	2·3	·8	1·3	1·4	5·8	83	4·4	372,200	1	1·54
Ipswich	...	...	...	8·705	8·52	3·290	·732	1·882	1·306	7·210	82·83	5·904	670,809	1·25	1·045
Keighley	...	...	...	8·962	8·675	3·031	·706	1·172	1·623	6·532	72·88	4·909	277,320	1·45	1·12
Kilmarnock ...	...	...	...	7·413	7·240	2·569	·695	1·235	1·408	5·907	79·6	4·499	314,191	1·25	1·13
Kirkcaldy ...	33	...	...	9·085	8·864	2·574	·758	1·238	1·558	6·128	67·4	4·57	698,804	1	1·558
Lancaster ...	...	...	...	8·10	7·80	3·11	·87	1·242	2·28	7·80	92·57	5·22	227,984	1·7	1·34
Leith	...	...	...	9·26	8·99	2·47	·86	1·27	1·03	5·63	60·98	4·60	984,428	1·027	1·02
Leyton	...	...	...	9·473	9·293	2·939	1·046	1·808	1·675	7·468	78·834	5·793	3,100,748	1·018	1·644
Lincoln	52	...	...	10·59	10·40	2·34	1·06	1·56	1·41	6·37	60·2	4·96	173,895	1·25	1·128
Liverpool ...	...	...	100,000	12·25	12·02	3·380	1·227	1·460	2·171	8·238	65·6	6·067	26,007,694	1·14	1·9
Lowestoft ...	...	...	...	9·1	8·8	2·60	·5	1·2	1·8	6·1	67·64	4·3	318,601	1·75	1·03
Maidstone ...	...	...	...	8·77	8·295	2·04	·90	1·63	1·40	5·97	71·96	4·57	366,191	1·125	1·217
Manchester ...	...	...	100,000	11·300	11·123	3·420	1·473	1·069	1·608	7·570	63·47	5·962	29,922,197	1·029	1·562
Nelson	134	...	...	11·66	11·60	2·98	·99	2·14	2·48	8·59	74	5·11	241,886	2	1·26
Newport (Mon.)...	...	...	...	10·622	10·385	2·594	1·053	2·402	1·651	7·700	72·49	6·049	1,178,500	1·30	1·22
Nottingham ...	...	6,164	22,500	11·35	11·16	3·06	·93	1·10	1·94	7·03	62·78	5·09	5,806,688	1·25	1·53
Oldham	...	...	...	13·351	13·101	3·186	1·191	3·288	2·316	9·981	74·75	7·665	3,158,752	1·5	1·544
Perth	...	...	...	9·39	8·51	3·08	·40	·77	1·46	5·71	60·79	4·25	295,846	1·25	1·17
Plymouth ...	...	...	4,037	12·066	11·450	2·42	1·11	1·29	2·298	7·12	60·83	4·82	1,159,069	1·66	1·38
Pontypridd ...	...	...	...	13·07	12·84	2·92	·76	3·84	1·85	9·37	71·7	7·52	631,981	1·25	1·48
Rawtenstall ...	...	...	...	10·11	9·699	2·40	·93	1·27	1·69	6·35	62·57	4·66	833,714	1·23	1·37
Rochdale	4,284	...	...	11·292	11·134	2·611	·682	1·524	1·654	6·471	56·2	4·817	2,836,062	1·006	1·694
Rotherham ...	E. ... R.T...	...	1,500	12·37	12·37	3·11	1·15	1·65	2·46	8·37	67·65	5·91	1,669,691	1·25	1·96
Salford	...	12,265	22,000	10·623	10·622	3·112	1·011	1·144	2·050	7·317	66	4·972	9,602,534	1·22	1·667
Southampton ...	1,282	...	5,134	...	...	...	...	...	...	...	...	...	...	...	...
Southend-on-Sea	3,346	2,000	7,000	13·8	13·63	2·90	·90	1·74	2·49	8·03	57·4	5·54	1,187,171	1·75	1·42
Southport ...	...	...	...	10·303	10·227	2·483	1·213	1·395	1·521	6·612	63	4·958	465,241	1·5	·977
South Shields ...	...	3,194	2,400	10·308	10·160	2·392	1·352	1·075	1·780	6·599	62·4	4·652	1,200,086	1·353	1·293
Stalybridge, &c.	...	...	...	8·084	8·056	2·755	1·079	1·600	1·453	6·887	83·15	5·269	1,803,063	·9	1·614
Stockport ...	...	250	9,137	10·389	10·322	2·413	·923	1·604	·731	5·671	55	4·940	2,078,189	·512	1·348
Sunderland ...	...	...	5,000	12·210	12·148	3·198	·905	·786	1·820	6·709	54·75	4·8	1,802,694	1·5	1·21
Swindon	...	...	...	9·62	9·24	3·06	·89	1·65	1·99	7·59	79·29	5·60	277,568	1·6	1·24
Wallasey ...	...	4,500	(a) 8,000	12·048	11·896	3·499	1·252	1·160	2·018	7·929	65·8	5·911	1,851,649	1·4	1·44
Walsall	2,372	3,474	2,000	13·217	12·908	2·869	1·204	1·503	1·954	7·530	56·97	5·576	882.078	1·68	1·206
Walthamstow ...	...	...	...	8·75	8·66	3·02	·62	1·85	1·79	7·28	83·23	5·49	1,491,700	1·375	1·3
Warrington ...	2,498	...	...	12·334	12·193	3·305	1·377	1·615	1·790	8·087	64·22	6·208	531,700	1·5	1·193
West Ham ...	...	273	...	9·713	9·427	3·359	1·314	2·127	1·239	8·039	78	6·41	6.306,731	·75	1·66
West Hartlepool	...	3,018	...	9·77	9·52	2·39	·79	1·49	1·13	5·80	59	4·67	680,972	·78	1·42
Wigan	902	...	...	12·415	12·077	2·791	·866	2·052	1·736	7·445	59·70	5·80	2,186,073	1·187	1·461
Wolverhampton	...	...	3,744	11·239	11·091	2·648	1·267	1·746	1·463	7·124	62·5	5·661	1,712,796	1	1·45
Yarmouth (Gt.)...	...	...	...	7·927	7·752	2·618	·704	1·008	1·575	5·905	76·17	4·30	708.756	1·50	1·046
York	...	1,212	...	9·45	9.31	3·11	·92	·88	1·89	6·80	71·87	4·91	...	...	...

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

									*					Works Cost.	
Belfast	...	...	12.185	10·08	9·93	2·83	·64	1·32	1·07	5·86	58·07	4·79	10,439,797	·658	1·39
Bexley	...	..	...	11·13	12·3	2·53	·85	2·82	·68	6·88	71·1	6·20	487,110	·827	1·66
Birkenhead ...	...	1,000	...	13·058	12·922	3·161	1·115	2·406	1·160	7·842	59·99	6·67	2,341,009	·60	1·936
Bournemouth ...	...	8,947	...	13·52	13·46	3·03	1·05	1·20	(b) 1·99	7·27	53·80	5·28	3,072,169	·65	1·69
Cardiff	10,002	...	...	12·354	12·14	3·843	·992	1·358	·835	7·028	59·1	6·193	4,936,582	·475	1·80
Coventry ...	103	...	...	9·902	9·734	2·971	·945	1·964	·778	6·658	67·2	5·88	1,651,950	·502	1·47
Glasgow	...	...	12,951	10·674	10·612	3·426	1·922	1·432	·515	7·295	59·87	6·266	33,848,947	·366	1·40
Huddersfield ...	8,400	...	...	11·05	10·79	2·92	·70	1·78	1·04	6·44	58·22	5·40	5,398,258	·49	1·93
Hull	...	4,574	10,000	8·61	8·53	2·87	·66	1·68	·61	5·82	67·58	5·26	6,352,263	·44	1·40
Leeds	...	...	81,567	10·936	10·834	2·914	1·016	1·099	·720	5·749	52·57	5·029	18,862,847	·668	1·918
Leicester	...	2,757	8,000	11·601	9·827	3·589	·757	1·263	1·927	7·516	65	5·589	7,096,154	·452	1·97
London	...	...	...	E. 9·77 H. 9·51	9·50 9·03	3·24 4·17	1·14 1·64	1·49 3·41	1·02 5·15	6·89 14·37	68·73 151·17	5·69 14·37	152,666,477 ...	·615 ...	2·60 ...
N'castle-on-Tyne	...	25,757	18,000	12·187	11·642	3·297	1·063	1·293	1·015	6·668	53·02	5·653	11,259,266	·382	1·968
Northampton ...	...	652	...	10·89	10·70	2·94	1·10	1·08	2·13	7·25	68	5·12	1,189,423	1·24	1·57
Portsmouth ...	6,568	(i) 6,000	10,000	12·201	11·997	3·092	1·308	·824	·549	5·773	45·88	5·050	3,272,089	·483	1·139
Preston	...	5,041	1,300	10·75	10·54	2·890	1·168	2·164	·700	6·922	64·40	6·222	1,765,250	·407	1·49
Reading	...	1,005	3,000	9·520	9·242	2·165	1·131	1·119	·945	5·360	54·55	4·248	1,180,507	·740	1·15
Sheffield	...	9,032	22.876	10·747	10·666	3·277	·866	1·236	1·345	6·724	61·116	5·379	18,329,775	646	1·979
Wellington, N.Z.	15,431	...	...	16·309	16·189	5·974	·801	2·259	1·850	10·884	65·86	9·034	4,769.149	·906	2·05

* The figures given under "Power" in Table II. include actual works costs only. H—Horse lines. E—Electric trolley system. (a)—Debit balance forward £426.
(b) Including current supplied by Bournemouth and Poole Supply Company. (e) ·161 Army Service allowance. (f) Insurance fund. (i) Including Insurance.
(k) Insurance. (r) Renewals Fund. (s) Military Allowances &c. £2,557. (t) Amounts for 15 months.

Digitized by Google

COMPARATIVE ELECTRIC TRAMWAY ACCOUNTS

Specially Compiled for "The Tramway and Railway World."

TABLE I.—TOWNS WITH COMBINED GENERATING STATION FOR TRACTION AND LIGHTING PURPOSES.

Name.	Population Served.	Car Mileage.	Passengers Carried.	Traffic Records. Passengers Carried per Car Mile.	Average Fare per Passenger. d.	Average Journeys per Head of Populat'n per Annum.	Average Car Miles per Day per Car.	Traffic Revenue per Mile of Single Track. £	Average Traffic Revenue per Annum per Head of Populat'n Served.	Operating Expenses per Passenger. d.	Average Distance of 1d. Fare. Miles.	Average Fare Charged per Mile. d.	Average Speed per Hour. Miles.	Average Total Car Hours per Day.	Average Number of Cars in Use Daily.	Number of Cars in Stock.
Aberdeen ...	165,000	1,909,009	24,048,816	12·59	·86	145·8	90	3,121	10/6	·514	1·861	·57	7·6	812	63	83
Accrington...	70,000	548,070	4,637,303	8·4	1·424	66·2	105	2,612	7/10	·85	1·07	·929	7·5	240	23	32
Ashton-u-L.	50,000	477,155	4,886,149	10·240	·657	164·84	109	2,757	9/-	·392	1·223	·81	8	209	12	25
Ayr	33,000	447,725	4,019,771	8·96	1·02	122	103	1,832	10/5	·65	1·25	·75	8	168	12	22
Birmingham	870,000	14,232,902	149,443,199	10·5	1·03	171·8	86·63	5,384	14/9	·76	...	...	...	...	...	..
Blackburn ...	200,000	1,091,050	12,246,151	11·22	1·20	61·26	105	2,655	6/6	·92	1·25	·76	7·5	434	31	61
Blackpool ...	67,500	1,085,655	13,624,514	12·55	1·32	201·8	103	4,370	22/4	·79	...	...	8	...	29	84
Bolton ...	221,000	2,886,180	31,370,166	10·86	1·066	141·49	124·07	2,920	12/8	·582	1·553	·633	7·25	980	70	112
Bradford ...	370,000	6,194,057	70,077,271	11·31	1·059	189	113	2,807	16/6	·84	1·66	·530	7·3	2,402·5	155	252
Brighton ...	133,936	1,108,352	11,837,828	11	1·10	88·38	76·08	3,165	8/1½	·83	1·27	·787	6·41	512	32	53
Burnley ...	175,000	1,644,712	15,867,699	9·65	1·16	96	120	3,544	8/10	·88	1·25	·83	7	798	42	67
Burton ...	48,000	440,021	3,311,355	7·53	1·06	69	...	1,790	6/4	·95	1·505	·58	7·5	...	...	20
Bury	128,202	1,613,357	15,513,264	9	1·07	121·47	99·73	1,904	10/9	·554	1·30	·77	8·54	...	...	54
Chester	39,028	347,318	3,275,944	9·43	·95	83·9	95	2,009	6/5	·64	1·27	·8	7	144·57	10·04	18
Chesterfield	50,000	304,376	2,950,774	9·7	1·1	76	122	2,668	5/5	·78	1·38	·75	7·33	126	7	17
Colchester ...	65,000	332,963	2,434,786	7·31	1·32	37·46	86·80	1,689	4/1	·94	·85	·96	6·77	147·14	10·51	18
Croydon ..	181,956	2,803,883	19,847,402	7·08	1·062	109·08	128	4,983	9/9	·850	2·15	·50	8·23	933·60	60	75
Darlington ...	62,383	387,714	4,234,783	10·9	·76	62·15	96·5	1,499	4/4	·52	1·219	·45	6·66	151·25	11	18
Darwen ...	...	267,670	2,741,987	10·24	1·28	...	...	2,045	...	·97	..	...	...	...	...	...
Derby ...	124,000	E 1,217,304	12,414,263	10·20	1·003	100·1	...	2,359	8/4½	·73	1	·775	6·5	...	36	50
Doncaster ...	60,000	529,122	5,747,273	10·86	·955	95·79	93·9	1,798	7/7	·711	1·25	·76	7·5	239	18	32
Dundee ..	165,000	1,388,345	18,753,140	13·50	·851	113	...	2,345	8/-	·544	2	·50	7·3	...	...	72
East Ham ...	145,000	1,596,984	18,916,971	11·84	·75	130	...	4,192	8/2	·65	1·71	·63	...	...	..	...
Exeter ...	48,660	449,103	4,611,444	10·27	·93	95	...	2,566	7/4	·603	...	...	...	...	...	24
Gloucester ...	53,972	624,402	4,358,510	7	·92	81	90·60	1,113	6/2	·75	1·5	·65	7·08	250·8	19	30
Halifax ...	176,000	2,330,104	20,707,071	8·89	1·27	118	81·76	2,015	12/8	·852	1·553	·82	7·23	883·74	78	101
Ilford ...	88,000	945,433	9,203,077	10·48	·78	104·6	...	2,462	7/2	·613	1·543	·69	8	...	..	27
Ilkeston ...	32,000	241,548	1,746,382	7·2	·95	...	90	1,942	52/8	·8	1·50	·5	7	101	7	13
Ipswich ...	76,472	642,092	5,610,332	8·73	·975	73·4	64·4	1,532	6/-	·82	1·53	·693	5·47	322·56	20·16	36
Keighley ...	43,500	247,791	3,552,016	14·3	·68	...	55·2	..	4/1	·45	2·17	·459	...	18	7	12
Kilmarnock	36,000	278,987	2,311,708	8·28	·87	64·2	96·83	1,507	4/8	·712	1·13	·86	7·22	98·03	7·88	14
Kirkcaldy ...	39,600	448,469	5,492,120	12·24	·723	138	49	1,882	8/4	·5	1·522	·64	7	158	17	22
Lancaster ...	41,908	170,337	1,559,037	9·15	·852	37·20	75	1,153	2/8	·812	1·71	·5	8	84·7	6·05	12
Leith ..	110,500	968,808	10,220,069	10·55	·85	92·5	126	2,017	6/7	·53	1·32	·72	8·4	315	21	37
Leyton ...	124,735	1,884,742	19,080,335	10·123	·918	153	121	4,077	11/8½	·769	1·847	·504	8·25	14·6	42·5	60
Lincoln ...	20,000	148,440	1,713,542	11·5	·89	85·67	59·3	2,169	6/5	·552	1·75	·428	7	72	4	8
Liverpool ...	840,000	13,657,888	145,656,374	10·67	1·127	173·40	89·09	5,516	16/3	·772	2·514	·39	7·75	5,040	420	596
Lowestoft ...	35,000	307,838	2,706,348	8	1·07	77·32	70·25	2,787	6/6	·703	1·5	·7	5·75	192	12	19
Maidstone ...	25,000	300,945	2,423,514	8·053	1·03	96·94	82	1,478	8/4	·741	1	1	6·8	128	12	19
Manchester	957,500	19,155,051	202,768,420	10·6	1·06	212	93·5	4,835	18/7	·717	2·514	...	7·75	7·2	561	683
Nelson ...	45,000	192,378	2,484,775	12·92	·85	55·22	87·84	2,407	4/2	·665	1	1	5·5	108	6	11
Newport ...	90,000	964,895	9,410,109	9·75	1·09	104	...	2,909	9/3	·79	1·164	·898	...	...	...	44
Nottingham	264,000	3,789,857	41,210,964	10·87	1·02	156	95·28	3,984	13/4	·646	1·75	·442	6·92	...	109	155
Oldham ...	180,000	2,045,840	22,171,712	10·837	1·19	123·176	...	3,018	12/4	·92	1·13	·863	7	...	...	97
Perth... ...	35,900	252,216	1,844,588	7·31	1·16	51	...	1,289	5/-	·78	...	...	...	...	...	...
Plymouth ...	112,000	838,142	9 333,087	11·13	1·027	83·33	...	2,666	7/2	·639	..	...	...	...	...	42
Pontypridd...	50,000	426,639	5,478,483	12·84	1	121	80·18	2,852	40/-	·73	1·5	·53	6·16	221	17	26
Rawtenstall	40,000	605,485	4,869,792	8·04	1·21	122	111	1,540	12/3	·79	1·121	·88	8·50	247·5	15	24
Rochdale ...	130,000	1,772,546	14,286,607	8·06	1·387	109·90	110·30	2,085	11/11	·78	1·07	·90	7·33	660	44	69
Rotherham...	64,000	E 850,548	9,828,838	11·55	1·07	153·6	...	3,645	13/1	·72	...	...	...	...	...	...
	...	RT ...	...	...	...	...	...	...	...	...	..	...	...	...	...	...
Salford ...	350,000	5,828,238	54,343,908	9·324	1·134	155	104	3,403	14/9	·78	2·20	·46	7·916	2,065·5	153	200
Southampt'n	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Southend ...	90,000	835,925	10,996,247	13·15	1·03	...	119	3,737	10,6½	·61	1·76	·66	8	18½	24	39
Southport ...	31,312	475,680	4,772,478	10·033	1·004	152·41	100	1,850	12/9	·7	1·6	·7	6·65	225	15	27
So'th Shields	110,600	927,728	10,479,421	11·296	·899	91	126	3,826	7/1	·58	3·1	·38	7·71	285	20	40
Stalybridge	94,091	1,116,936	8,406,915	7·706	1·06	89·3	...	1,353	8/-	·905	1·22	·72	6·8	...	...	60
Stockport	120,000	1,541,700	12,184,055	7·903	1·290	101·5	97·5	2,358	10/11	·726	1 333	·750	7·500	559	43	50(e)
Sunderland	170,000	1,486,201	18,619,364	13·2	·97	109·5	78·3	3,696	8/10	·536	1·34	·68	7	688	43	70
Swindon ...	53,000	223,383	2,392,470	10·71	·859	45·14	75	1,955	3/4	·709	1·2	·85	6	...		12
Wallasey ...	87,000	1,284,938	13,555,876	10·54	1·15	153·51	99·2	3,190	14/8	·75	1·89	·54	7	388·53	35·5	67
Walsall ...	100,000	731,640	7,886,190	10·779	1·198	79	95	2,249	7/10	·69	1·24	·79	7	315	21	39
Walth'mst'w	130,000	1,146,743	13,499,838	11·77	·732	103	104	3,089	6/4	·618	1·18	·86	7·6	430	37	38
Warrington	86,000	445,459	6,012,212	13·474	·903	69·91	102·24	2,344	5/3	·59	1·246	·803	6·39	180·99	11·937	21
West Ham	296,570	3,760,361	42,667,561	11·35	·852	144	90	5,041	10/-	·67	1·85	·50	7·66	1,195·75	93	118
W. Hartlep'l	90,000	479,382	4,261,917	8·89	1·07	47	94	2,163	4/3	·65	1·262	·94	7	203	14	26
Wigan ...	200,000	1,495,786	13,811,709	9·23	1·344	69	97·57	2,427	7/6	·802	1·15	·88	7·4	567	42	73
Wolverh'ton	135,000	1,181,309	12,236,785	10·359	1·06	90·64	89	2,539	8/1	·687	1·25	·879	6·85	651·6	36·2	52
Yarmouth ...	56,000	677,153	4,236,424	6·25	1·239	75·65	80	1,500	7/10	·944	1·25	·76	7	310	23	35
York	82,600	762,540	...	...	..	...	...	...	...	...	...	...	...	...	...	..

TABLE II.—TOWNS WITH SEPARATE GENERATING STATIONS FOR TRACTION.

Belfast ...	390,000	6,432,600	62,340,269	9·74	1·02	159	128	2,689	13/8	·60	1·96	·43	8·75	2,014	241	290
Bexley ..	16,500	316,970	2,270,070	7·16	1·55	133	126	2,922	19/10	1·24	1·59	·63	9·5	179	11	16
Birkenhead	137,996	1,209,117	14,822,697	12·25	1·052	107·41	73·46	2,702	9/3	·992	1·39	·66	6·84	483·81	45·09	65
Bournem'uth	120,000	1,815,632	16,967,210	9·34	1·44	141	...	3,103	16/11	·78	1·19	·87	6·8	...	...	91
Cardiff ...	182,729	2,742,546	30,424,407	11·09	1·09	166	85	4,358	15/2	·85	1·44	·736	7·5	1,408	88	130
Coventry ...	135,000	1,100,553	8,730,024	7·9	1·22	65	59	2,832	6/7	·84	1·18	·866	6·2	487	41	51
Glasgow ...	1,150,000	24,214,460	336,260,758	13·887	·764	292·4	105·61	5,404	18/7	·488	2·31	·44	8·11	8,974·78	628·20	856
Huddersfield	160,000	(a) 2,797,276	23,933,065	8·69	1·24	159	84	3,556	15/6	·73	1·34	·69	7·72	1,012·16	63·26	106
Hull	291,118	4,551,145	52,087,770	11·44	·745	178·92	123·43	4,879	11/1	·52	2·75	·364	9	1,565·60	97·85	180
Leeds ...	525,000	9,522,737	95,639,268	10·04	1·075	182	115·43	3,747	16/4	(b) ·884	1·93	·539	7·54	3,465	230	345
Leicester ...	232,644	3,899,939	40,440,158	10·369	·947	170	...	4,202	13/8	·72	2·18	·45	8	...	...	160
London ...	...	E 58,706,161	547,253,332	9·32	1·02	...	117·07	8,465	...	·73	...	...	8·95	17,972	1,374	1,730
		H 272,631	3,244,661	11·90	·76	...	77·12	1,045	...	1·21	...	...	5·85	131·80	10	37
Newcastle ...	300,000	5,775,323	65,085,452	11·27	1·073	217	...	4,454	18/8	·592	1·58	·633	...	...	...	223
Northampt'n	91,500	690,177	8,295,941	12·02	·89	90·66	...	2,470	6/8	·603	1·34	·7	...	...	...	55
Portsmouth	246,000	2,438,621	27,554,194	11·299	1·061	112·01	90·29	3,535	9/1	·495	1·66	·62	7	1,065	74	100
Preston ...	120,000	1,025,738	10,340,688	10·08	1·04	86·17	132	2,652	7/7	·764	1·01	·95	7·36	404·7	21·3	33
Reading ...	76,500	924,696	8,881,097	9·6	·96	116	114	2,704	9/4	·54	1·59	·68	7·8	336	25	36
Sheffield ...	485,228	8,810,252	107,023,195	12·147	·878	220	108·86	4,950	16/2	·553	2·917	·371	...	3,215·05	221·728	339
Wellington	70,000	2,328,849	24,565,376	11·28	1·43	359	85	4,708	44/10	1·031	1·125	·89	7·59	840	75	92

Digitized by Google

FINANCIAL REPORTS AND MEETINGS.

Sao Paulo Tramway, Light and Power Company.—A dividend of 2½ per cent. on the issued common stock has been declared.

Rio Tramway, Light and Power Company.—The directors have declared a dividend of 1¼ per cent. on the issued capital stock.

Willans and Robinson, Limited.—The directors announce a dividend of 10 per cent. on the ordinary shares for the past year, carrying forward £8,776.

Falkirk and District Tramways Company.—The report states that the net revenue for the year, including £674 brought forward, was £5,813. A dividend of 6 per cent. has been declared and £726 carried forward.

La Plata Electric Tramways.—The accounts for 1915, including £6,614 brought in and after providing for debenture stock and other interest, show a credit balance of £12,142, which the directors recommend be carried forward.

A Rate in Aid for Heywood.—Last year's working of the Corporation Tramways resulted in a loss of £518, as against a loss of £1,042 the previous year. The Electricity and Tramways Committee, have decided to ask for a rate of 4d. towards the deficiency on the electricity department, and 1d. for the tramways department.

Rochdale Tramways.—The total receipts for the past year were £82,846, an increase of £4,477. The cars have run 1,600,678 miles, a decrease of 88,535 miles. 13,705,871 passengers were carried, an increase of 298,553 on the year. The receipts work out at nearly 12½d. per car-mile, or more than a penny per mile in excess of the receipts of 1914–15.

Oldham Corporation Tramways.—For the year ended March 31, the net profit on the tramways was £3,985, and the gross profit over £10,000. Out of the latter the department had paid £5,225 in war allowances to employees' dependents, £1,000 for an extension of Hollinwood depot, and £548 for a street improvement. On the three motor omnibuses there was a loss of £720, including a payment of £494 to the sinking fund.

Llanelly and District Lighting and Traction Company.—Mr. A. R. Holland, who presided at the annual meeting, stated that the results so far for the corresponding period of 1915 showed an increase by both tramway and power sections, and he was glad to say the outlook for the future was satisfactory. Resolutions were passed providing for dividends at the rate of 6 per cent. per annum on the cumulative preference shares and 2 per cent. per annum on the ordinary shares carrying forward £673.

Calcutta Tramways Company.—The net profits for 1915, including £7,566 brought forward, were £116,736. A final dividend of 6s. 6d. per share is proposed, making 9½ per cent. for the year, transferring to reserve for depreciation, etc., £15,000, and to staff provident fund £1,309, carrying forward £6,812. The reserve at the commencement of the year stood at £80,550. After deducting therefrom £14,066 written off for renewals, and adding £15,000 proposed to be allocated, it will stand at £81,484.

Depression at Yarmouth.—Last summer the war again brought about a shortage of visitors to the east coast, with the result that the Great Yarmouth Tramways receipts for the year ended March 31 show a decrease of £5,751. The number of passengers was 1,097,760 less, and the decrease in mileage 132,613. The outlook for the present year is also depressing. Early in the morning of April 24 this and the neighbouring port of Lowestoft—both unfortified places—were subjected to bombardment.

Oldham, Ashton and Hyde Electric Tramways.—The report for 1915 states that the revenue amounts to £34,823 (compared with £33,398). The expenditure (including £1,600 for debenture interest and £1,500 placed to renewals account) amounts to £25,062 (compared with £26,024), leaving a net profit of £9,761 (compared with £7,374). Added to £1,021 brought forward, available balance is £10,782. The directors propose to place to reserve fund £3,000, a dividend at the rate of 6 per cent. per annum on the ordinary shares and to carry forward £2,282. The ordinary dividend has been 6 per cent. for 12 years past.

Colonial Companies and Double Income Tax.—As the result of representations made to the Government concerning the hardships entailed by the imposition of double income tax within the Empire, a matter of importance to many tramway companies, the Chancellor of the Exchequer, introducing the recent Budget, said the question would have to be dealt with in the promised reconstitution of our income tax law. For the present, where the Dominions tax was not less than 1s. 6d., he would be content with not imposing any further burden. Persons affected would be entitled to claim repayment of the additional rate now imposed.

Yorkshire (Woollen District) Electric Tramways Company.—The report for 1915 states that revenue amounted to £71,594, being an increase of £6,209. After deducting all expenses chargeable to revenue, including repairs and maintenance, payments to local authorities under agreements, debenture and other interest, and setting aside £5,000 to renewals fund, there remains £13,363, which, added to £2,587 from last account, makes an available balance of £15,949. It is proposed to apply to reserve fund £4,000, to pay a dividend at the rate of 4½ per cent. per annum on the ordinary shares, and to carry forward £2,948.

Cork Electric Tramways and Lighting Company.—The directors' report for 1915 shows that the revenue was £63,905 and the expenses £42,415, leaving £21,490, plus £2,480 brought forward. Interest on debentures requires £4,600, and 5 per cent. preference dividend £6,163. The sum of £6,500 is added to depreciation and renewals reserve, £1,776 is to be written off wiring consumers' premises, £890 written off investments, and £4,041 is to be carried forward. Lighting and power business continues to show satisfactory progress. The number of passengers carried was 5,899,003, as against 5,858,904 in 1914; the car mileage was 870,094, as against 832,227.

Penny Universal Fare at South Shields.—Alderman W. G. Wylie, chairman of South Shields Tramways Committee, has reported that the tramways have now been ten years in existence. The first year's receipts were £24,000, while for the year ended March 31 last the revenue was £42,942, an increase of £1,900 as compared with the previous year. The undertaking had proved a great municipal success. The amount given in relief of the rates last year was £2,400, which was equal to more than a penny rate. Early in 1913–14 the Corporation, as the result of a report presented by Mr. W. T. Robson (who last year became general manager at Southampton) introduced the penny universal fare.

Dublin and Lucan Electric Railway Company.—At the annual meeting Mr. J. W. Hill (chairman) said that the cost of all materials was steadily rising. For the past two years they had been unable to pay any dividend on the preference capital. In order to increase their receipts, the directors had increased both passenger and goods rates. The total receipts were £7,510, the highest the company had experienced. Unfortunately, the cost of working more than counterbalanced the higher receipts. After providing for debenture interest to date, there was an available balance of £528 5s. 7d., which the directors recommended be carried to the next account, postponing the payment of the cumulative preference dividend for the present.

Potteries Electric Traction Company, Limited.—The report for the year ended December 31, 1915, shows that the revenue amounted to £136,167 and the traffic receipts to £119,872, the latter being an increase of £4,789. After deducting all expenses chargeable to revenue, including £11,269 for debenture and other interest, there remains £40,872, an increase of £5,047 as compared with 1914. Adding £1,698 brought forward, there is an available balance for distribution of £42,570, which the directors recommend should be allocated as follows:—Reserve account, £8,036; renewals account, £10,000; dividend on preference shares (5 per cent.), £12,250; dividend on ordinary shares (3 per cent.), £7,350; balance forward, £4,934. The reserve will then stand at £36,824, and the renewals account at £35,738. The receipts from the tramways and omnibus services showed satisfactory increases during the second half of the year, but owing to the shortage of labour, working conditions were exceedingly difficult.

Wallasey Corporation Tramways.—The following comparison of traffic results for the year ended March 31, 1916, with the figures for the previous year, has been issued by Mr. R. B. Greene, the general manager:—

	March 31, 1916.	March 31, 1915.	*Inc. or Dec.*
Traffic receipts	£65,833	£63,697	+ £2,136 or 3·33%
Miles run ...	1,231,461	1,284,939	− 53,478 or 4·16%
Passengers ...	14,306,621 (a)	13,555,876 (b)	+ 750,745 or 5·53%
Receipts per car-mile ...	12·830d.	11·897d.	+ ·933d. or 7·84%
Average fare per passenger ...	1·154d.	1·152d.	·002d.

(a) Including 626,464 military passengers (free of charge).
(b) ,, 286,172 ,, ,, ,,

Bradford Tramways in 1915-16.—Mr. C. J. Spencer, general manager of the Tramways Department, has presented to the Tramways Committee approximate figures relating to the financial year just concluded. The total receipts amounted to £334,315, an increase of £14,921, or 4·7 per cent. The car mileage amounted to 6,199,601, a decrease of 172,109 or 2·75 per cent., compared with the previous year. The decrease was due to a shortage of men and of stock. Notwithstanding the large withdrawal of men who had joined His Majesty's forces the number of passengers—74 millions—exceeded that of the previous year by four millions. There was an increase of 230,000 units in the consumption of electricity, representing roughly a cost of £1,000. The larger number of passengers carried and the heavier loads borne by the reduced number of cars in service account in part for the greater consumption of electricity. The wage bill amounted to £129,313, an increase of £9,182. War bonus totalled £7,102, and allowances to dependents of employees serving in the forces, £7,352. With regard to the expenditure Mr. Spencer states that certain important returns are not yet available.

Digitized by Google

Aberdare Tramways and Railless Cars.—Mr. A. J. Abraham, general manager, has presented to the Tramways and Electricity Committee his report for the year ended March 31. As the tramway department has not yet been working two full years, comparisons are not yet possible. The following traffic records cover the operations for 1915:—

	Car Miles	Passengers	Passengers per car mile.	Revenue per car mile.	Costs per car mile.
Cars	285,200	2,474,309	8·68	11·89d.	6·12d.
Omnibuses	77,182	570,792	7·39	8·71d.	7·48d.

The tramways are 2·7 miles in length, and the gross profit was £6,780. Allowing for interest and loan repayment, there is a net surplus of £4,044, which is equal to 2·52 per cent. on the capital. The railless omnibus system, which is still being worked by the contractors, has a route length of 2·98 miles. The gross profit was £423, and after providing for interest, certain special expenditure and loan repayment, there was a deficit of £574. Up to January 1, 1916, 38 employees, or 40 per cent., had joined the forces.

Brush Electrical Engineering Company.—The net profits for 1915, including £7,065 brought forward, were £24,365 after providing for debenture interest. It is recommended that £8,000 be appropriated for depreciation, and £2,044 in payment of the further 4 per cent. interest to which the holders of the 6 per cent. prior lien participating second debenture stock are entitled out of the first net profits available for dividend in any year, that £5,000 be placed to the reserve, and £9,321 carried forward. Mr. E. Garcke, presiding at the annual meeting on April 18, in moving the adoption of the report, said that despite the many difficulties of the past year they had maintained the improvement of recent years. The gross profits were a little larger, being £61,800, as compared with £60,800 in 1914. But the general charges had been £1,200 higher, and they had spent £1,200 more on maintenance of plant and buildings, so that the net distributable profits for 1915, after paying all debenture interest, were £17,300, compared with £19,100 in 1914. The performance of the Ljungstrom turbine continued to be highly satisfactory. Mr. B. S. Broadhurst (managing director) seconded the motion.

British Westinghouse Company.—Mr. J. Annan Bryce, M.P., presiding at the annual meeting, criticised the excess profits tax, which, he said, made no distinction between profits derived out of the war and profits made from normal business during the war, if the total profits of a company during the war exceed those of the twelve months prior to the war. In the case of the Westinghouse Company, the larger profits of 1914, as compared with previous years, were not due in any sense to the war, but were actually smaller than they would have been had there been no war. Yet the company would be called upon to pay to the Government one-half of the extra profits of that year. With regard to the general business of the company, one order in 1915 amounted to £500,000, and was for the electrification of an important railway. Apart from this, the orders showed an increase over 1914 of some 30 per cent., and a considerable part of this increase was probably due to the absence of German competition from which the company had suffered so much in the past. Taken on the whole, the prospects as regards the company were favourable. Although he entered Parliament as a Free Trader, he advocated that steps should be taken to meet the competition of enemy countries.

London County Council Tramways.—For the year ended March 31 it is anticipated that the accounts will show a deficiency of £64,160, which will have to be met by drawing upon reserves. The general reserve fund stands at about £70,000, but owing to the depreciation in securities this figure may be reduced by £6,000, which will necessitate taking that sum from the renewals reserve. This fund amounts to about a quarter of a million. During the past year the revenue has provided £120,000 in respect of employees' war allowances, £450,000 for debt redemption, and £400,000 for interest. At the meeting of the Council on April 18, Sir George Goldie, chairman of the Finance Committee, introduced the estimates for the financial year 1916–17, and in referring to the tramways deficit deprecated the drawing of conclusions as to the financial prospects of the undertaking from the position under war conditions. They had once more to face a deficiency, although it was not a "loss" in the commercial sense. If the estimated results of this year should be realised, and they had to find a sum of £74,000 to make both ends meet, the reserve fund might barely suffice for the purpose. There would still remain a substantial amount to the credit of the renewals fund, which might be regarded as available, if necessary. Some satisfaction might be derived from the fact that, according to the latest figures, the results of the year were likely to show an improvement on the original estimate—an adverse balance of £91,614 was expected to be reduced to £64,160, notwithstanding the strike of May, 1915, which occasioned a loss estimated at £100,000.

Belfast Corporation Tramways.—Mr. Andrew Nance, general manager, has presented his eleventh annual report to the Tramways and Electricity Committee. The report covers the year ended March 31, 1916, and shows that the total revenue amounted to £280,641, while the working expenses were £159,801, making a trading profit of £120,840, an increase of £7,515 as compared with the results of the previous year. The net revenue charges included interest on debt, income-tax, etc., and, deducting the credit balance on Glengormley Pleasure Grounds account, amount to £64,104, leaving a sum of £56,735 (an increase of £5,235) for appropriation, which is strictly defined by the Aberdeen Clause of the Belfast Tramways Act, 1904, and is as follows:—

Sinking fund	£32,434
Depreciation fund	17,000
General purposes fund (amount promised for 1915-1916)	5,000
General purposes fund (on account of £15,000 promised for 1916-1917	2,302

Mr. Nance calculates that the payments to the dependents of employees with the forces, which are included in the working expenses, and the war bonuses, amount to £10,081. Notwithstanding the serious additions to expenditure, the increased cost of power and material, etc., all the usual financial charges, including depreciation, have been fully met. A year ago Mr. Nance estimated that the total receipts would reach £283,000. He calculates that £2,090 were lost by reducing the service for eleven weeks on some of the routes from a ten to twenty minutes service, which, it may be added, was contrary to his advice. If the amount thus lost be added to the actual receipts it produces £283,004, a sum very nearly the same as the original estimate. The results for the current year ended March 31, 1917, Mr. Nance estimates as follows:—Total receipts, £298,750; working expenses, £165,120; trading profit, £133,630; net revenue charges, £64,450; net profit, £69,180; appropriation charges, £52,000; surplus, £17,180.

Manchester Corporation Tramways.—Alderman J. Bowes presided over a meeting of Manchester Tramways Committee, at which the general manager (Mr. J. M. McElroy) submitted the estimates of receipts and expenditure for 1916–17. The estimated receipts are £950,365 (including the transfer of £10,865 from the reserve fund to meet extraordinary expenditure), as against an approximate income of £939,416 for the past year. The estimated expenditure for the current year is £950,365. The Committee agreed to contribute £100,000 in relief of the rates, as on two previous occasions, but to do this they may have to take £10,865 from the reserve fund. This rate contribution was fixed by the Council three years ago, and before another year passes a fresh arrangement will be proposed by the Committee, who regard the position of affairs as very serious, owing to the large payments in respect of war service allowances. The general manager submitted the following statement in connection with the estimates:—

	1914.	1915.	1916.
Total revenue	£925,310 ...	£901,876 ...	£939,416
Car miles run	19,463,646 ...	19,155,051 ...	18,486,440
Revenue per car mile	11·41d. ...	11·3d. ...	12·196d.
Passengers carried ...	205,608,741 ...	202,768,420 ...	209,853,344

Last year's revenue was higher than that of the year 1914, which was a record year. The earnings per car mile were 12·196d., which is a much higher figure than in any previous year. Although the number of passengers was greater, the ordinary working expenses were considerably less than either of the two preceding years, as will be seen by the following table:—

	1914.	1915.	1916.
	£	£	£
Traffic expenses	276,663 ...	273,002 ...	261,968
General expenses	89,420 ...	85,809 ...	88,484
Repairs and maintenance ...	89,649 ...	85,280 ...	81,594
Power expenses	129,492 ...	128,350 ...	130,390
	£585,224 ...	£572,411 ...	£562,436

The increase under the head of general expenses for the past year as compared with the previous year is due to an increase in the amounts paid in local rates. During the past three years the local rates paid to the city and the various out-districts were as follow, viz.:—1914, £45,154; 1915, £45,794; 1916, £49,507. The increase in the power expenses is due to the greater price paid for electrical energy owing to the higher cost of coal. The prices per unit charged by the Electricity Department for the last three years were as follow, viz.:—1914, 1·026d.; 1915, 1·023d.; 1916, 1·085d. (estimated). If the same price per unit had been paid last year as in 1914 the total of the power expenses would have been £123,474 instead of £130,390.

The estimates for the current year are based upon an estimated car mileage of 18,500,000. The sum of £40,000 estimated for income tax may be considerably reduced if the Trading Committee succeed in convincing the arbitrator that their view of this matter is the correct one. In this event the Tramways Committee would not only be able to avoid having to make the transfer from the reserve fund to meet the estimated deficiency, but would be able to pay to the credit of such fund a sum of about £10,000.

The large payments in respect of war service allowances were a very serious drain on the financial resources of the department.

Digitized by Google

The following are the figures for the past two years and the estimated figure for the current year :—Year ended March 31, 1915, £31,764 ; 1916, £92,881 ; 1917 (estimated), £94,000 ; total for three years, £218,645.

The committee had only been able to meet the payments in respect of war service allowances by transferring less sums each year to the reserve and renewals fund.

Record Results at Leeds.—The accounts of the Leeds tramways were, we believe, the first municipal tramway records for the year ended March 31 last to be published. Mr. J. B. Hamilton, general manager, was able to present to the Tramways Committee a draft statement of the receipts and expenditure on April 17. After the committee had considered the statement, the chairman (Alderman R. A. Smithson) expressed satisfaction with the result of the year's working, and, on behalf of the committee, complimented the general manager and his staff upon their labours. Owing to the large number of motormen and conductors who have joined the forces, the department were unable to utilise fully the stock of cars. The extension of the tramways in the Wharfedale district added 17,000 to the population served by the tramways. We append a comparison of the receipts and expenditure from the financial statements of the past three years :—

	Year ended March 31.		
	1916.	1915.	1914.
	£	£	£
INCOME :—			
Traffic revenue	467,197	429,902	423,516
Advertising	2,620	3,915	3,822
Mineral haulage	634	—	—
Rents	5,054	693	117
Total	£475,505	£434,510	£427,455
EXPENSES :—			
Traffic	114,724	115,601	113,819
General	41,190	40,347	41,144
Repairs and maintenance ...	42,786	43,609	41,020
Power expenses	16,837	14,035	24,345
Energy purchased	15,178	14,542	6,054
War bonus to employees ...	5,512	—	—
Total	£236,227	£228,134	£226,382
Balance—Net revenue	239,278	206,376	201,073
Bank Interest	4,443	1,343	2,674
Dividends on investments	5,867	6,493	5,679
Total	£249,588	£214,213	£209,427
Interest	3,818	3,818	2,784
Interest on capital	49,474	44,527	42,176
Income tax	15,349	7,356	5,343
Rent of lines	3,071	3,125	3,223
War allowances	13,270	4,460	—
Balance to appropriation fund ...	165,204	151,526	155,898
APPROPRIATIONS :—			
Redemption fund...	72,488	57,572	53,914
Cost of Acts	703	258	403
Renewal of permanent way ...	3,146	7,771	31,576
Renewal of rotary converter ...	—	4,156	—
Third party risk reserve ...	2,044	—	—
Reserve fund	15,000	—	—
Net surplus	71,821	81,567	70,004

As compared with the previous year, we have the following results :—

	Year ended March 31, 1916.	Year ended March 31, 1915.	Increase + Decrease –
Receipts ...	£475,661 ...	£434,510 ...	£41,150/11 + (9·47%)
Miles run ...	9,405,121 ...	9,522,737 ...	117,616 – (1·23%)
Passengers ...	103,453,801 ...	95,639,266 ...	7,814,533 + (8·14%)
Receipts per mile	12·138d. ...	10·951d. ...	1·187d. + (10·84%)
Average fare paid per passenger	1·080d. ...	1·075d. ...	0·005d.
Population served	542,000 ...	525,000 ...	17,000 + (3·23%)
Times population carried ...	191 ...	182 ...	9 + (4·94%)
Amount paid per head of population	17/2 ...	16/4 ...	10d. + (5·10%)

The working expenses were again under 50 per cent. of the revenue.

CONTRACTS AND ORDERS.

The Motor Rail and Tramcar Company, Limited, Lombard Street, E.C., have supplied a number of petrol tractors to the War Department.

Siemens Brothers and Company, Limited, have received an order for the supply of two and a half miles of service cable from Leyton Urban Council.

Edgar Allen and Company, Limited, have obtained a contract for supplying and supervising the fixing of points and crossings for Gloucester Corporation Light Railways, and for a lay-out for Leyton Council Tramways.

Darlington Council have accepted the tender of Messrs. Babcock and Wilcox, Limited, for the supply and erection of coal-handling plant at the electricity works, and of B. Blackett and Sons for overhead coal bunkers.

Bradford Electricity Committee have accepted the following tenders :—Musgrave and Company, Limited, induced-draught plant and two steel chimneys ; Electromotors, Limited, three fan motors ; Ferranti, Limited, two 250 k.v.a. transformers.

West Ham Council have been recommended by the Electricity Committee to extend for two years the contract of the British Westinghouse Company for the supply of transformers, with the addition of a sliding scale based on cost of material and labour.

Wolverhampton Electricity Committee have recommended acceptance of the following tenders :—Brush Electrical Engineering Company, two 300 KW. transformers ; Reyrolle and Company, switch gear ; Stirling Boiler Company, two boilers, two superheaters, and two sets of mechanical stokers.

Dover Tramways Committee offered the contractors for the supply of tickets an increase of 5 per cent. instead of 10 per cent., as requested. Although the company pointed out that the war had invalidated existing contracts, the committee have decided to adhere to their previous offer. The Municipal Tramways Association wrote that the Paper Commission stated that there should be no difficulty in obtaining an adequate supply of tickets.

Johannesburg Council have been recommended by the Tramways and Lighting Committee to accept the appended tenders :—Two 3,000 KW. turbo-alternator sets, with Parsons condensing plant, switch gear, and cable connections, erected complete, including excavations and foundations, Sykes and Company, £26,395 ; spare rotor, Sykes and Company, £798 ; wet air filtration plant, of capacity not less than 36,000 cubic feet of air per minute, Griffin Engineering Company, £690.

Brake Blocks.—In reply to remarks made at a meeting of Belfast Council in regard to tenders for brake blocks, Councillor M'Caughley, chairman of the Tramways Committee, said the tenders were dealt with in the usual way. The cross-channel firm quoted £8 9s. for a twelve months' contract, and the local firm would only contract for six months at £9. Slipper blocks were quoted at 9s. and 12s. 6d., and the Belfast firm's figure was 16s. 2d. If the Corporation wanted the local firm to get the contract, he had no objection.

Salford Electricity Committee have accepted the following tenders : Two 1,000 KW. rotary converters, British Westinghouse Electric and Manufacturing Company, Limited, £5,590 (including £400 for contingencies) ; one 500 KW. rotary converter, General Electric Company, Limited, £1,579 15s. (including the sum of £100 for contingencies) ; two water-tube boilers, superheaters, economisers, induced-draught plant, mechanical stokers, flues, and chimneys Babcock and Wilcox, Limited, £11,544 (including £500 for contingencies.)

The Woods-Gilbert Rail Planer Company, 2, Norfolk Street, London, W.C., are carrying out a contract for remodelling the rails of Bexley Urban Council tramways. In the Woods-Gilbert process a special machine is used which deepens the groove, cuts down the guard lip, and removes corrugations and the dish at joints. Bolton Tramways Committee have also entered into a contract with the company for the treatment of their rails in the same way. This contract was placed after the sub-committee had inspected the successful work done by the company at Wigan.

The Victorian Railways Department have placed the following contracts :—British Westinghouse Company, frequency changers and rotary converters for Spencer Street and Elwood sub-stations ; R. W. Cameron and Company, battery signal machines and Ackley brakes ; McKenzie and Holland, electric point and lock detectors ; Noyes Brothers, toggle insulators for St. Kilda-Brighton electric railway ; Gibson, Battle and Company, 15-ton electric crane, etc., £1,596 ; Forman and Company, railway and electric tramway crossing, £229, and steel anchor bolts for overhead equipment.

Delivery of Motors.—Mr. G. F. Craven, general manager, Reading Corporation Tramways, has reported that Messrs. Dick, Kerr and Company, Limited, are prevented by the Minister of Munitions from delivering the six car motors that were ordered in November last. At the request of the representative of the Minister of

Digitized by Google

Munitions, he had attended at Armament Buildings and pointed out that the motors were needed to reduce the repair work, that the cars were carrying munition workers, and that Government work was being done in the repair shop. The representative, however, had recommended the Minister to refuse a certificate to Messrs. Dick, Kerr and Company on the ground that the motors were not needed for cars used exclusively for carrying munition workers. The controllers, which were ordered at the same time, had been delivered.

Salford Tramways Committee have accepted the tender of Scholey and Company, Limited, 56, Victoria Street, London, for a supply of steel tires, at £1,055, and that of Brown-Bayley's Steel Works, at £932 10s., also for steel tires. The following contracts for annual supplies have been placed :—

Car Accessories (Mechanical).—W. J. Ritchie and Company, National Rail and Tramway Appliances Company, and Anti-Attrition Metal Company.
Ears, Frogs, Pull-offs, etc.—British Insulated and Helsby Cables, Watlington and Company, J. Hall, and British Westinghouse Company.
Iron and Steel.—J. Kidd and Sons, and Vickers Limited.
Special Car Accessories.—British Westinghouse Company.
Wire, Solder, Lead, and Tin.—British Insulated and Helsby Cables, L. Andrew and Company, R. Johnson, and Clapham and Morris.
Special Paints and Varnishes.—Nobles and Hoare.
Trolley Cord.—L. Andrew and Company.
Car Accessories (Electrical), Insulating Materials, etc.—W. McGeoch and Company, W. T. Henley's Telegraph Works Company, General Electric Company, L. Andrew and Company, British Westinghouse Company, Micanite and Insulators, Limited, North British Rubber Company, Griffiths Brothers (insulating varnishes), C. Macintosh and Company, British Insulated and Helsby Cables, Siemens Brothers Dynamo Works, Le Carbone, Limited, H. Norbury and Company, Gabriel and Company, and W. Boydell and Sons.

PERSONAL.

Dr. E. Hopkinson has been appointed a member of the Indian Commission on Industrial Development.

Mr. J. G. Potts, superintendent of Bury Council Electricity Works, has had his salary increased from £180 to £200.

Mr. W. H. Beable, vice-chairman of the Sales Managers' Association, is visiting Russia as the representative of various firms to open up new trade avenues.

Mr. T. Law, of Rotherham Corporation Tramways staff, has been presented with a clock by the employees at the depot, on the occasion of his marriage with Miss H. Moon.

Mr. H. Pilling, general manager and engineer of the Accrington Corporation Tramways, has been granted an increase in salary of £50 by the unanimous vote of the Town Council.

Mr. H. Dickinson, Liverpool city electrical engineer, has accepted an invitation to advise Wigan Council as to the improvement of their electric supply undertaking. The fee will be 150 guineas.

Mr. S. L. Pearce, city electrical engineer, Manchester, has been permitted by the City Corporation to advise the authorities of Rochdale, Chesterfield, and Stafford on proposed extensions of their electricity works.

Rotherham Council have increased the salaries of the traffic superintendent (Mr. H. Jagger) and the chief traffic clerk (Mr. C. Webster) from £150 to £162 10s. per annum, with further advance to £175 on March 25, 1917.

Mr. G. W. P. Page, who for the past two years has been engaged chiefly on publicity and other technical work in the publication department of the General Electric Company, has enlisted in the London Electrical Engineers.

Mr. Clifford C. Paterson, principal assistant in charge of electrotechnical and photometric buildings at the National Physical Laboratory, has arranged to join the Osram-Robertson Lamp Works, Limited, as director of laboratories for research and technical manufacturing purposes.

Alderman H. W. Littler, the chairman of the Tramways and Electricity Committee of West Ham Corporation, has resigned his membership of the Council. The Committee have passed a resolution expressing high appreciation of his services in the development of the two undertakings.

Mr. R. L. Horsfield, general manager, Walsall Corporation Tramways, has had his salary increased by £100 per annum. Alderman J. Cope, chairman of the Tramways Committee, informed the Council that no application was received from Mr. Horsfield ; the proposal was solely that of the Committee.

Mr. J. F. Cameron, general manager and electrical engineer, Northampton Corporation Tramways, stepped into a six-feet deep inspection pit in the darkness while supervising repair work at the generating station in April 22. He sustained fractures of two ribs. Two or three days later he returned to duty.

Mr. F. Schofield, manager of Leyton Council Tramways, having had to undertake additional duties consequent upon the Council deciding not to insure against third party risks, the Tramways Committee recommend that his salary be increased from £400 to £425, to be followed by annual increments of £25 until it reaches £500.

Mr. P. J. Pringle, M.I.E.E., M.I.M.E., has been appointed consulting engineer and assessor to the Tramway Board recently formed, and will act in connection with the transfer of the Melbourne Tramway and Omnibus Company's undertaking to the Tramway Board. Mr. Pringle is general manager and chief engineer of the Electric Supply Company of Victoria, Limited, and will continue to discharge these duties.

Mr. E. G. Moggridge has been appointed by the Board of Trade to the position of assistant secretary of the railway department of the Board of Trade, in place of Mr. W. F. Marwood, who has been appointed second secretary to the Board. Mr. Moggridge was formerly assistant secretary to the marine department. Mr. C. Hipwood becomes assistant secretary of the marine department in place of Mr. Moggridge.

Mr. C. P. Sparks has been nominated for a second year as President of the Institution of Electrical Engineers, Mr. J. S. Highfield for re-election as vice-president, and Mr. R. A. Chattock as a new vice-president. Mr. J. Devonshire, of the allied Tramways Companies in London, and Mr. J. O. Callender, assistant manager of Callenders' Cable and Construction Company, are nominated by the Council for vacancies as associates on that body.

Mr. A. L. C. Fell, the chief officer of the London County Council Tramways, has recently passed through a serious and critical illness. He is now approaching convalescence, but it will be some two months before he can resume duties. Meanwhile his place will be taken by Mr. J. K. Bruce, the deputy chief officer of tramways, particularly as one of the representatives of the Council on the Rolling Stock and the Permanent Way and Building Conciliation Boards.

Mr. E. Powell has been unanimously re-elected president of the Society of Motor Manufacturers and Traders. In the report of proceedings for the year 1915, presented to the new Council, it was pointed out that in spite of the absence of exhibitions, trials, competitions, etc., there had been a number of meetings beyond the average. Some of these were special meetings, dealing with subjects to which the president had given personal attention, and as similar matters were likely to continue to require attention on behalf of the industry generally, the unanimous desire was expressed that Mr. Powell should consent to retain office, which, in the circumstances, he agreed to do. The new vice-presidents are Mr. A. Brown and Mr. E. Hopwood.

Mr. Edgar Peckham, of Queen Anne's Chambers, Westminster, who is well known in connection with the Peckham tramway truck in America and Europe, has invented a smoke-consuming device. The invention can be applied to steam boiler furnaces and also to domestic stoves and grates. Besides rendering them smokeless, the device, according to Mr. Peckham, will greatly reduce the consumption of coal. This result is of especial importance at a period when fuel has become very costly. In Manchester and other manufacturing districts, where the question of smoke prevention has been given special study of late years, Mr. Peckham's appliance should be assured of a trial. We understand that he desires to obtain assistance towards that end.

Mr. Percy Priestley, general manager and engineer, Mexborough and Swinton Tramways Company, has been selected by Oldham Tramways Committee for appointment by the Council as general manager of the tramways undertaking, at an initial salary of £400. The directors of the company will regret the departure of Mr. Priestley, who has had charge of their undertaking since 1907. He was formerly assistant manager of Halifax Corporation electricity undertaking, and is 41 years of age. Forty-seven applications were received for the Oldham vacancy, and the following candidates were selected for an interview, in addition to Mr. Priestley :—Mr. H. Pilling, general manager, Accrington Corporation ; Mr. W. Billington, assistant manager, Salford ; Mr. J. Brierley, chief inspector, Oldham ; Mr. F. Buckley, general manager, Wigan ; Mr. W. Chamberlain, joint electrical engineer and manager, Oldham ; Mr. H. J. Jackson, chief assistant to the traffic superintendent, Manchester ; Mr. A. Eardley, manager, Stockport ; Mr. J. Wood, general and confidential assistant, Liverpool.

Alderman J. H. Aston, of Huddersfield, died on April 13. He was for nine years chairman of the Tramways Committee, and retired in November last on account of ill-health. The Committee at that time placed on record their high appreciation of his services.

Mr. G. Proudman, who has died at Birkenhead, was a former chairman of the Tramways Committee of that borough. He had been in the service of the London and North Western Railway Company for 45 years at Broad Street Station, London, and at Birkenhead.

WITH THE FORCES.

Lieutenant E. T. Jones, formerly in the employ of Sheffield Tramways Department, has been mentioned in dispatches.

Second-Lieutenant H. P. Bramwell, who at the outbreak of the war was with the British Thomson-Houston Company, has been wounded while engaged in photographic work in an aeroplane.

Corporal J. W. Smith, a Nelson Corporation tramcar conductor, has been awarded the D.C.M. The Tramways Committee have passed a resolution expressing appreciation of his gallantry.

Lieutenant H. C. Clifton, East Lancashire Regiment, who has been killed in action while serving with the Kut relief force, was an electrical engineer with Messrs. Siemens Bros. at Woolwich.

Digitized by Google

Private R. F. Sparling, 9th Lancers, who for three years before the war was a Manchester tramways motorman, has been awarded the D.C.M. for conspicuous bravery at Loos, where he was wounded.

Lieutenant R. F. Parkinson, R.E., who has been awarded the Military Cross for conspicuous gallantry in France, was an assistant on the engineer's staff of the Tilbury section, Midland Railway.

Lieutenant J. Briggs, R.E. Railway Troops, late an engineering assistant in the western divisional engineer's office of the Midland Railway at Derby, has been promoted to temporary captain. He has been in France since February last.

Second-Lieutenant T. O. H. Bates, 89th Punjabis, died on April 12, of wounds received in action. He joined the Indian Army from the position of chief electrical engineer to the Tata Steel and Iron Company, Bombay, and was formerly engineer in charge at Morley Corporation electricity works.

Flight-Lieutenant G. H. Reid, of the Royal Naval Air Service, and late of Callender's Cable and Construction Company, was taken prisoner during the British seaplane raid on the enemy's airships depot in Schleswig-Holstein. He was captured while his machine was in difficulties on the sea after he had rescued Sub-Lieutenant Hay from his disabled seaplane under heavy fire.

Lieutenant W. A. Blythe, 12th Siege Battery, R.G.A., has been awarded the Military Cross for conspicuous gallantry as forward observing officer. For more than a fortnight he was repeatedly under fire, and his telephonist was killed at his side on the last day. Lieutenant Blythe, who was engineer to Hill's Patent Motor Vacuum Road Cleanser, Limited, received his commission in November, 1914, and was at the front for nearly a year before being sent into hospital suffering from concussion and gas.

Sergeant W. R. Smethurst, Royal Sussex Regiment, a motorman on the Salford Tramways, was, on April 18, presented with the Distinguished Conduct Medal for gallantry on September 25 last at Le Rutoire (Loos). During that engagement the officers of his company had been put out of action, but the sergeant took command, although he had been seriously wounded. By his bravery and example he materially assisted in the attack. The presentation was made at a meeting of the Tramways Committee by Alderman Worsley, the Deputy Mayor. On behalf of the Tramways Committee, Alderman Linsley, the chairman, handed the sergeant an illuminated copy of a resolution passed by the committee, congratulating him upon the distinction he had won. In reply, Sergeant Smethurst, who before the war was a reservist, stated that his period of service had now expired, but he was not going to claim his discharge.

Lance-Corporal C. Taylor, East Lancashire Regiment, who has been killed on active service, was a conductor on the Leeds tramways.

Lieut.-Colonel Gurney Sheppard, one of the directors of the Mersey Railway, fell during the Dardanelles operations. At the annual meeting of the company, Mr. J. Falconer, M.P. (chairman) expressed the directors' profound regret at his death.

The Late Captain J. H. Courtis, Oxford and Bucks Light Infantry, son of Sir John Courtis, chairman of Cardiff Tramways Committee, is mentioned in the despatch forwarded to the War Office by General Sir John Nixon, relative to the operations in Mesopotamia, from April to September, 1915.

RAILWAY OFFICERS AND STAFF.

Mr. F. E. Jacobs has been elected chairman of Rhondda and Swansea Bay Railway Company.

Mr. Thomas Richardson has been appointed chairman of Belfast and County Down Railway. He has been a director for twenty-one years.

Mr. R. C. Willis, on promotion to the position of registrar of the London and North Western Railway Company, has been presented with a cabinet of cutlery by his colleagues in the audit department. Mrs. Willis received a gold bracelet.

Mr. R. W. Reid has been appointed works manager of the Midland Railway carriage and wagon department, in succession to Mr. T. James, retired. Mr. Reid, who has been with the Midland Company since August, 1909, is the son of Mr. W. P. Reid, locomotive superintendent of the North British Railway.

Mr. A. C. Rumboll, general traffic manager, Great Indian Peninsular Railway, is one of the members of the committee formed to collect information with a view to its use in the provision of railway facilities at Delhi, the new capital of India.

Sir Guy Granet, general manager, Midland Railway, has temporarily been appointed to act in an honorary capacity as controller of a new department termed the Department of Import Restrictions. It has been formed by the Government to give effect to the prohibition or restriction of imports of certain goods to meet the present and apprehended deficiency of tonnage. The office of the department is at 64, Victoria Street, S.W.

Tramway Material for New Zealand.—The Takapuna Electric Tramways Company, Auckland, has decided to raise the sum of £50,000 for the electrification of the existing steam tramway.

TRAMWAY AND LIGHT RAILWAY NOTES.

BIRMINGHAM.

TRAILER CAR EXPERIMENT.—OMNIBUSES TO RELIEVE PASSENGER CONGESTION.

The Tramways Committee, who recently made inquiry as to the working of trailers in London, have decided to experiment with the running of a trailer on the Handsworth route. Several motor omnibuses have been delivered out of twelve that were ordered in February last. By this means relief has been given to the congestion on several routes. Owing to the decision of the committee to postpone until after the war the scheme for a tramway from Salford Bridge to Tyburn, omnibuses are being provided for the conveyance of workers in that district.

BLACKPOOL.

THROUGH RUNNING AGREEMENT.

The Corporation Tramways Committee have, with the consent of the Council, decided that the privilege of running cars on the Corporation's tramways should be granted to the Blackpool and Fleetwood Tramroad Company and the Blackpool, St. Annes and Lytham Tramways Company on the terms of a through running agreement in each case.

BRADFORD.

VOLUNTEER MOTORMEN.—LOSSES THROUGH ENLISTMENT AND MUNITION WORK.—PENALTY FOR QUEUE INFRINGEMENT.

Six volunteer motormen, representing various grades of society, are engaged on the Bradford cars on Saturdays and week-ends. Others are undergoing training. The department up to March 31 had lost about 500 men through enlistment and transfer to Government work. Of the men who entered the forces 14 have been killed in action and 49 wounded, while five are prisoners of war in Germany. The Board of Trade have approved of the regulations recently made by the Corporation, at the instance of the Watch Committee, requiring that if there are six or more persons waiting for cars at any specified place they must stand in proper order in a queue. This applies to places where there are no barriers as well as where barriers exist. The penalty for infringing the rule is a fine not exceeding 40s.

COLWYN BAY.

THE QUESTION OF DOUBLE-DECK CARS.

Colonel Druitt, R.E., has reported to the Board of Trade in favour of double-deck cars being allowed to run on the Old Colwyn and Penrhyn Bay section of the Llandudno and Colwyn Bay Electric Railway Company, but he recommends that certain parts of the track should first be repacked. Colonel Druitt found the line for the most part very well laid and equipped, and recognised the difficulties in obtaining the necessary labour for maintenance during the war.

GATESHEAD.

BOARD OF TRADE AND THE RUNNING BACK ACCIDENT.

The Railway Department of the Board of Trade have informed Gateshead Council that Colonel von Donop, R.E., in his report with reference to a car running back on Bensham Bank, has informed the company that a slight change in the position of Ravensworth loop would provide a better gradient for cars to stand on, and, further, recommended that a rule be issued providing that motormen should not leave their cars during the journey. The Tramways Company have written the Council to the effect that they were prepared to carry out the suggestions in regard to the lengthening of the Ravensworth loop. The directors were in favour of a double line for the full distance, and they submitted that as part of a scheme. They were also in favour of double lines on all gradients. Strict instructions had been given to motormen not to leave their cars, except in special circumstances, and to apply hand and track brakes when stopped on a gradient.

LEEDS.

MINERAL HAULAGE.

During the year ended March 31, Leeds Corporation Tramways Department received £633 for haulage of minerals for a colliery company from Harehills to their works in Oldfield Lane and Elland Road.

LEICESTER.

THE CRITICAL PERIOD OF A TRACK.—COST PER YARD FOR CORRUGATION GRINDING.

In his annual report to the Tramways Committee, Mr. E. G. Mawbey, borough engineer, states that the track is in very good order, considering that it has had nearly twelve years' service, but he considers that it will require careful watching, as it has reached a critical period. A fair stock of rails bought before the great rise in prices is in hand. The length of rails ground during the year for the removal of corrugations was 11,655 yards, at an average cost of 1·365d. per yard. The cost of maintenance and repair work showed a diminution due to economies effected owing to the war. The expenditure was £5,931, as compared with £6,498 in 1914 and £6,956 in 1913. Various new points and crossings were fixed, and

Digitized by Google

a number of curves and junctions relaid with heavy silicon steel rails. The widening of the Haymarket and Belgrave Gate, and the doubling of the track through this portion of the Belgrave route has greatly facilitated the traffic, both tramway and general, and has enhanced the appearance of the centre of the town.

LONDON.

M.E.T. to Use Trailers.—Higher Fares in East Ham.—Woolwich Track Doubling.—Ilford and Penny Universal Fare.

The Metropolitan Electric Tramways, Limited, have applied to the Board of Trade for permission to use trailer cars along the tramways and light railways running from Acton to Paddington, and from Paddington via Craven Park and Cricklewood to Hendon in order to meet certain temporary difficulties. Kensington Council will raise no objection to the running of such cars in their district during the period of the war. Trailers are now operated on three of the South London routes of the London County Council Tramways. The third service—from the Embankment to New Cross—was started towards the end of April, and the other services are to Tooting and Norbury, at which places the London United and the Croydon Tramways respectively have a terminus. The services work with great smoothness, and are a great convenience. The trailers and the couplings were fully described and illustrated in our issue of October 14 last. Alderman M. Oakes, chairman of East Ham Tramways Committee, has reported that in the first week of the new fare stages the receipts increased by £900. That continued until the omnibuses started the same fares, and even a little longer. A more direct effect was the increased service of omnibuses. Another thing that had lately reduced the takings was the early closing. The Ministry of Munitions have informed Woolwich Council that the widening of the tramway track at various places is a matter of extreme urgency. The Council have consequently informed the London County Council that they have no objection to immediate doublings at two places where no street widening is required. With a view to inviting the assistance of the Ministry in the matter of widenings at other points, the Borough Council have invited the County Council to form a joint deputation to wait upon the Ministry. Mr. L. E. Harvey, manager and engineer, Ilford Council Tramways, has advised the Tramways Committee to consider the question of instituting the penny universal fare. In view of the increased working expenses he suggests that the scheme should be adopted for the duration of the war.

NEWCASTLE-ON-TYNE.

Increase of Workmen's Fares.—Extension of Services.

The Corporation on May 3 adopted a recommendation presented by the tramways committee to increase the prices of the coupon tickets issued to workmen. In future there will be no travelling at reduced fares unless the passenger produces a coupon ticket. These are sold in packets of a dozen. The fare has been increased owing to the higher cost of working. It was also recommended that half fares to soldiers and nurses be continued, but that the minimum fare be one penny instead of a halfpenny. The Council, however, did not adopt the latter recommendation. Councillor R. Mayne, chairman of the committee, in proposing the adoption of the recommendations, said that instead of making 2d. per car-mile on the workmen's traffic they were making scarcely ½d., which was not enough to pay for renewals, to say nothing of any contribution to the rates, which would be badly wanted next year. The undertaking as a whole was remunerative. Since April 14 the service of cars, which had been reduced owing to the restricted lighting and shortage of staff, has been extended by an hour, the last car on some routes leaving shortly after 11 p.m.

PLYMOUTH.

Cost of Devonport Tramways Acquisition.

The costs incurred by Plymouth Corporation in connection with the Devonport and District Tramways arbitration totalled £7,736, the several items being:—Witnesses, £2,879; counsel, £1,350; agents, £205; committee's expenses, £118; officers' expenses, £30; printing, £235; miscellaneous expenses, £190; arbitrator's fee, shorthand note, and printing of proceedings, hire of room, etc. (one-half payable by Corporation), viz., £1,415; stamp duty on transfer, £1,040. Upon the statement being presented to the Council on April 10, Councillor Bond stated that the company asked £260,000 for the undertaking, and as the result of the arbitration the Council had to pay only £111,000, while their costs were £7,735. The Corporation have received sanction to the borrowing of £111,706 in respect of the purchase. The repayment is to be spread over thirty years.

SWANSEA.

Corrosion of Steel Guard Wires.

The electrical engineer to the Corporation has reported that a number of breakdowns of overhead equipment on the Morrison tramway route were due to the falling of guard wires. The Tramways Company have decided to re-equip about six miles of line with bronze guard wire, owing to the steel wire having become badly corroded.

TRAMWAYS AND LIGHT RAILWAYS CONGRESS.

Programme of Annual Congress.

The following are the provisional arrangements for the Tramways and Light Railways Association's annual congress, to be held on Friday, June 30:—

2.30 p.m.—Annual general meeting, Westminster Palace Hotel, S.W.

3 p.m.—Paper by Mr. W. Tuke Robson, A.I.E.E., general manager, Southampton Corporation Tramways. Discussion to follow.

4 p.m.—Visit by special omnibuses to the London General Omnibus Company's Training School, Milman Street, Chelsea, where members will be received by Mr. H. E. Blain, operating manager of the L.G.O. Company, and the Underground Railways.

Inspection of class-rooms, drivers' and conductors' courses, mess-room, clothing stores, etc., and cinematograph hall, where special films will be exhibited showing London traffic scenes, with special reference to rules of the road for tramcars, omnibuses, and other traffic methods of training, etc. This will be followed by tea, during which Mr. Blain will give a short address on "The Safety Movement."

7.30 p.m.—Members' dinner at the Trocadero.

The members of the Council to retire by rotation at the annual meeting are Messrs. C. Shirreff Hilton, S. E. Baker, J. W. Dugdale, T. B. Goodyer, H. L. Williams, and John Cameron.

DON'TS FOR WOMEN CONDUCTORS.

The following instructions, printed on a small card, have been issued to the women conductors employed on the Birmingham Corporation Tramways:—

1.—**DON'T** signal to the driver to proceed until perfectly sure that all intending passengers have been picked up and the platform is clear. Neglect of this precaution has caused **serious injury** to many passengers.

2.—**DON'T** ring the bell for the car to start when **inside.** It is impossible to see that the platform is clear from inside, and it looks **lazy.**

3.—**DON'T** fail to report all accidents, no matter how **trivial,** upon the proper form and on the day of occurrence; witnesses must be obtained when possible; if unobtainable, the reason should be stated. Failure in this respect results in the Tramways Department having to pay **compensation** that would not be paid if the full facts were available.

4.—**DON'T** fail to **call** out all stopping places as clearly as possible; it prevents a lot of grumbling.

5.—**DON'T** fail to be **smart, clean, and polite** at all times; the good name of the department is mainly in the hands of the employees.

6.—**DON'T** be late for duty. Tramway workers must be **punctual,** otherwise the passengers cannot be.

7.—**DON'T** make mistakes in the time or relieving point when taking down the duty; considerable mileage is lost through **carelessness** in this respect.

8.—**DON'T gossip.** Passengers' questions should be answered politely, but the conversation should not be continued. The work generally is being neglected when this regulation is not observed.

9.—**DON'T** ride on the motorman's platform under any circumstances. The motorman has enough to do to avoid **accidents.**

10.—**DON'T** fail to obtain the **legal fare** due from each passenger, and **don't** be careless with the tickets. Tickets issued **out of order** cause considerable unnecessary work and often get lost. Tickets not returned are charged for.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

Applications for Letters Patent.

The following applications for Letters Patent were filed previous to April 21, 1916:—

Self-propelled vehicle (4,843)—Baguley Cars, Limited, and E. W. Baguley.

Steam turbines (5,020)—K. Baumann.

Steering and fore-carriage mechanism for motor vehicles (5,146)—F. J. Bretherton, and Clayton and Shuttleworth, Limited.

Electrical driving for motor vehicles (4,962)—H. Crochat.

Gear boxes for automobiles (4,842)—T. Gill.

Electrically bonding rail ends (5,092)—J. C. Lincoln.

Digitized by Google

Apparatus for indicating the speed of vehicles (5,086)—D. McNeill.
Steering and fore-carriage mechanism for motor vehicles (5,146)—P. W. Robson.
Elastic or resilient tires for road vehicles (5,148)—J. F. van der Velde.
Railway switch or point levers (4,964)—L. W. Williams.
Steam motor road vehicles (5,352)—Bleachers' Association.

FOREMAN PLATELAYER.

Wanted, Working Foreman Platelayer, permanent job. Apply, giving particulars of experience and wages required, Engineer and Manager, Rhondda Tramways Company, Ltd., Porth, Glam.

FOR HIGH-CLASS
CONDENSING PLANT
WRITE TO
THE MIRRLEES WATSON CO., LTD.,
SCOTLAND STREET, GLASGOW.

ORIENTAL
The name ORIENTAL has always been associated with highest grade
SEAMLESS STEEL TUBES
—it's a name that is recognised throughout the Trade as a guarantee of quality, strength and accuracy. We also make Electric Welded, Butt Welded and Close Joint Steel Tubes. Ask us to quote you.
ORIENTAL TUBE CO., LTD., WEST BROMWICH.
'Grams: "Tubes, West Bromwich."
'Phone: 45, West Bromwich.

Railway and tramway ticket holders (5,344)—T. Bowden.
Railway vehicles (5,247 and 5,248)—T. F. Craddock (*Burn and Company and another*).
Lifeguards for vehicles (5,235)—P. Deamer.
Ramps for re-railing vehicles (5,438)—V. I. Feeney.
Lubrication of motor vehicles (5,361)—J. B. Ferguson.
Motor vehicles (5,485)—A. Good.
Motor driven vehicles whereof the motor may be utilised for driving the vehicle or dynamo carried thereon (5,259)—J. L. Gordon.
Side-splash guards for vehicles (5,316)—H. V. N. Graveley.
Train-stopping apparatus (5,238)—A. X. W. Grondin.
Stations or stopping place indicator for tramcars (5,213)—C. W. Mallins.
Increasing the tractive power of motor vehicles (5,265)—A. T. Marks.
Steam motor road vehicles (5,352)—D. Morgan.
Motor road vehicles (5,565)—F. Sumner-Smith.
Lubricating devices (5,227)—Westinghouse Brake Company.
Motor road vehicles (5,565)—R. P. Young.
Electrical systems for engines (5,841)—W. A. Chryst.
Differential gear for motor vehicles (5,610)—T. H. Cleathero.
Reinforced concrete railway sleepers (5,701)—C. C. Coade.
Electrical systems for engines (5,841)—C. F. Kettering.
Brake apparatus for railway vehicles (5,866)—E. S. Luard.
Chairs for railway rails (5,626)—H. Lumsdon.
Tubular radiators, condensers, etc., for motor vehicles (5,671)—O. D. North.
Railway signalling apparatus (5,673)—J. P. O'Donnell.
Tablets for train signalling on single lines of railway worked on the electric train tablet block system (5,637)—F. Roberts.
Railway signalling and interlocking apparatus (5,722)—Saxby and Farmer.
Differential gear for motor vehicles (5,610)—F. Spurr.

Specifications Published.

1914.

Device for automatically adjusting railway brakes (10,692)—Bóra.

1915.

Brake for vehicles (3,242)—Barmby.
Motor starting mechanism (4,318)—Mobil-Werke Akt.-Ges.
Train signalling and control systems (5,766)—Woodward.
Motor vehicle bodies (6,851)—Maddox.
Adjustable trailer brake (8,351)—Neate.
Resilient wheel tire (11,554)—Murrey and Wood.
Change-speed gearing for motor vehicles (4,548)—Robinson.
Vehicles and vehicle trains (11,904)—Porsche, Reik, and Oesterreichische Daimler-Motoren Akt.-Ges.
Railway guard rails (16,322)—Betts.
Vehicle wheels (9,755)—Maddocks and Reading.
Turbine apparatus (11,515)—Westinghouse Machine Company.
Railway rolling stock (12,713) Sheffield and F. R. Rand and Company.
Fluid pressure braking apparatus (16,283)—Westinghouse Brake Company.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1915. WEEK ENDED.					1916. WEEK ENDED.					AGGREGATE.		
	April 3	April 10	April 17	April 24		April 1	April 8	April 15	April 22		Wks.	1916.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Anglo-Argentine	51,093	47,569	53,734	53,329	...	50,588	52,399	53,462	47,697	...	17	813,468	− 2 933
Auckland	...	...	...	...	...	...	...	...	...	...	—	—	—
Burma... ... ... Rs.	3,625	3 678	3,473	3,758	...	3,566	3,905	3,690	3,456	...	38	—	+ 7,321
Calcutta ... ... Rs.	62,078	59,514	63,972	62,452	...	64,334	67,169	69,389	64,524	..	17	1,089,330	+ 67,441
Madras ... ... Rs.	(2 weeks)	28,604	(2 weeks)	30,370	...	(2 weeks)	30,818	(2 weeks)	32,361	...	17	251,470	+ 23,409

Companies Issuing Monthly Statements.

	1914.		1915.				1915.		1916.				Wks.	AGGREGATE.	
	Nov.	Dec.	Jan.	Feb.	March.	April.	Nov.	Dec.	Jan.	Feb.	March.	April.		1915-16.	+ or −.
	£	£	£	£	£		£	£	£	£	£	£		£	£
Brazilian Street Mlrs.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Brazilian Traction Mlrs	5929730	6010490	5996190	5797500	6294910	...	6336000	6527000	6430000	6079000	6711000	...	13	19,220,000	+ 1,131,400
Brisbane	28,600	30,890	29,620	34,050	30,740	...	31,120	33,960	32,280	30,320	34,275	...	13	96,875	+ 9,925
British Columbia $	648,485	674,063	640,495	558,512	557.135	...	562,782	603,667	591,949	572,935	577,117	...	39	4,982,147	− 772,894
Buenos Aires Pt. & C.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze	42,256	44,000	43,301	38,877	44,332	41,765	42,603	43,528	40,596	39,137	42,219	40,220	43	413,102	− 8,139
Cape Town	..	15,869	15,660	...	...	...	13,870	16,589	16,030	...	14,994	...	—	—	—
Carthagena & Herrerias	1,379	1,255	904	1,822	2,436	1,496	2,090	2,129	2,841	1,585	2,991	2,513	18	9,930	+ 3,272
Cordoba	12,468	12,091	11,945	11,534	12,746	...	13,785	13,025	12,329	11,831	13,598	...	52	161,906	+ 6,251
East India	2,029	1,839	1,914	1,649	1,846	1,864	2,065	2,062	2,015	1,863	2,196	2,116	39	18,706	+ 1,466
Kalgoorlie	2,414	2,905	2,372	2,352	...	...	2,611	3,018	2,236	2,248	...	...	9	4,484	− 240
La Plata	4,540	4,452	4,540	4,016	4,582	...	4,545	4,564	4,533	4,346	4,613	...	13	13,492	+ 362
Lima	29,712	32,411	33,043	30,164	34,185	...	30,703	34,685	34,014	32,900	34,159	...	13	101,073	+ 3,681
Manila ... ... $	129,000	132,500	...	...	...	...	129,447	141,350	...	...	...	...	52	1,495,534	− 108,031
Melbourne	...	...	62,729	59,086	...	...	...	72,658	69,879	69,395	...	...	9	139,274	+ 17,459
Mexico ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	27,081	28,605	32,459	30,008	29,716	26,786	28,407	31,305	34,252	32,502	31,956	28,997	26	187,419	+ 12,764
Fort Elzabeth ...	...	...	...	...	...	...	3,110	4,360	4,193	3,857	...	...	—	—	—
Puebla ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Rangoon	4,405	4,459	4 689	4,991	5,217	4,964	5,028	4,492	4,763	4,674	5,501	4,849	18	19,787	− 74
Toronto ... $	824,634	...	843,351	767,326	820,750	...	851,113	...	906,350	846,256	910,969	...	13	2,663,575	+ 232,148
Winnipeg ... $	330,398	368,400	350,681	314,658	303,209	...	323,025	377,121	297,560	293,250	296,500	...	13	887,310	− 81,239

(*Continued on page 368*)

Digitized by Google

TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED.				1916. WEEKS ENDED.				AGGREGATE.		
	April 3	April 10	April 17	April 24	April 1	April 8	April 15	April 22	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdare	319	374	324	341	327	232	363	393	3	998	− 50
Aberdeen Corporation	1,507	1,626	1,620	1,602	1,612	1,756	1,667	1,688	46	81,882	+ 5,102
Accrington Corporation	*	...	...	...	...	...	...	...	—	—	—
Ayr Corporation	254	343	279	280	246	274	279	313	50	17,123	+ 1,071
Bath Electric	*	...	...	...	...	...	...	...	—	—	—
Birkenhead Corporation	1,257	1,362	1,253	1,231	1,438	1,418	1,388	1,459	3¼	4,706	+ 145
Birmingham Corporation	6,344	13,995	12,286	12,445	12,379	16,178	15,832	15,461	3	50,639	+ 6.214
Birmingham Corp. Motor Omnibuses	337	863	674	685	575	842	806	767	3	2.578	+ 58
Blackburn Corporation	1,117	1,632	1,167	1,167	1.016	1,227	1,115	1.060	3¼	3,930	− 721
Blackpool and Fleetwood	499	802	397	338	351	333	332	754	16	5,479	− 201
Blackpool Corporation	488	1,724	705	667	683	1,216	730	872	3	2,817	− 944
Bolton Corporation	2,755	2,775	2,612	2,516	2,763	2,725	2,619	3,441	4	9,844	+ 116
Bournemouth Corporation	2,000	2,163	2,174	2,048	1,594	2,057	1,923	3,006	4	8,581	− 441
Bradford Corporation	5,657	7,521	6,475	5,849	6,152	6,400	6,329	6,296	3	20,627	− 2,142
Brighton Corporation	991	1,060	945	901	938	974	910	1,241	3⅞	3,447	− 103
Bristol	8,584	10,520	9,957	8,957	8,845	9,671	9,755	9.305	16	146,564	+ 7,339
Burnley Corporation	1,699	1,733	1,541	1,465	1,571	1,665	1,602	2,113	4	6,951	+ 513
Burton-on-Trent Corporation	265	299	267	262	227	228	240	269	3	799	− 122
Bury Corporation	980	1,447	1,329	1.242	586	1,308	1.272	1.730	3⅞	4,897	− 102
Cardiff Corporation	1,140	2,851	2,438	2,426	545	2,711	2.814	2,693	3	8,763	− 92
Chatham and District	1,037	1,329	1,081	1,156	1,031	1,114	1,139	1,132	16	16 703	+ 546
Chesterfield Corporation	206	334	251	251	281	243	259	272	3	774	− 15
Colne Corporation	262	272	259	225	294	270	242	368	—	—	—
Cork Electric	429	513	481	484	433	468	465	471	16	7,134	+ 2
Croydon Corporation	...	550	1,670	1,669	...	1,796	1,259	958	3	4,013	− 342
Derby Corporation	967	1,158	959	945	1,035	1,071	1,046	1,139	3¼	3,488	− 125
Dover Corporation	172	299	273	269	210	280	277	305	3	913	− 87
Dublin and Lucan	154	200	127	139	113	129	130	135	16	1,859	− 164
Dublin United	5,652	6,960	6,326	6,101	5,856	6,083	5,988	...	15	87,417	+ 3,402
Dundee City	1,212	1,294	1,346	1,289	1,240	1,354	1,325	1,262	48¼	65,557	+ 3,621
East Ham Corporation	1,279	1,409	1,291	1,309	1,168	1,214	1,231	1,271	3¼	3,934	− 264
Exeter Corporation	304	414	328	330	319	353	342	339	3	1,036	− 134
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	20,438	21,028	21,206	21,560	21,610	22,303	22,533	22,422	47	1,019,880	+ 74,680
Glasgow Subway	1,053	1,046	1,068	1,106	1,219	1,221	1,247	1,222	16	19,978	+ 2,470
Glossop (Urban Elec. Supply Co.)	120	131	116	115	128	135	124	150	17	2,195	+ 322
Halifax Corporation	1,908	2,537	2,006	1,984	1,854	1,392	2,023	1,915	2¼	5,329	− 1,197
Halifax Corp. Motor Omnibuses	38	61	45	42	35	30	36	36	2¼	103	− 46
Hastings and District	746	1,074	915	932	705	836	783	911	16	11,818	+ 425
Huddersfield Corporation	2,334	3,386	2,387	2,353	2,646	2,778	2,664	2,708	3	8,151	+ 25
Hull Corporation	3,033	3,289	2,982	2,981	2,949	2,948	3,058	3,169	3	9,687	− 1,038
Ilford U.D. Council	...	702	588	606	...	650	644	659	3	2,085	+ 98
Ilkeston Corporation	...	137	115	115	...	125	122	122	3	370	+ 2
Ipswich Corporation	424	504	399	407	478	454	420	493	3	1,454	+ 48
Isle of Thanet	323	213	326	339	244	257	245	310	29	7,336	− 1,409
Kilmarnock Corporation	155	167	162	161	156	157	165	170	49	8,133	+ 320
Lanarkshire	1,706	1,866	1,833	1,944	1,892	2,262	2,106	2,214	16	33,808	+ 5,548
Lancashire United	1,440	2.094	1,567	1,631	1,535	1,748	1,648	1,608	16	25,284	+ 783
Leeds City	8,023	9,873	8,098	8,254	8,796	9,335	8,992	9,017	4	29,498	+ 2,161
Leicester Corporation	2,888	3,217	2,801	2,814	3,172	3,259	3,200	3,231	16	51,496	+ 6,153
Leith Corporation	661	718	677	676	764	893	798	786	49	37,700	+ 3,494
Leyton U.D. Council	1,497	1,936	1,544	1,594	1,432	1,554	1,536	1,505	3	4,595	− 478
Liverpool Corporation	12,171	13,772	12,562	12,850	13,021	13,665	13.443	13,567	16¼	213,137	+ 10,043
Llandudno and Colwyn Bay	290	473	323	326	196	217	236	298	20¼	4,004	− 425
London County Council	46,463	37,872	47,777	48,996	44,069	33,560	...	...	51⅔	2,299.705	− 27,382
London General Omnibus	*	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	167	189	166	159	115	122	124	133	28¼	4,828	− 1,134
Maidstone Corporation	131	390	188	196	166	317	189	186	3	692	− 82
Manchester Corporation	16,182	18,567	16,869	17,566	17,472	18,239	17,670	18,091	3	57,713	+ 2,938
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	...	...	...	...	—	—	—
Nelson Corporation	137	214	155	169	83	203	182	269	3¼	737	+ 62
Newcastle-on-Tyne Corporation	5,888	6,132	5,995	5,821	5,946	5,892	5,981	6,111	3	19,268	− 1,648
Newport (Mon.) Corporation	739	871	760	736	836	860	876	865	3	2,806	+ 782
New St. Helens and District	874	1,278	890	950	814	940	904	854	42	41,485	+ 2,910
Northampton Corporation	487	964	633	626	527	584	600	656	3	1,840	− 383
Nottingham Corporation	3,047	4,388	3,424	3,363	4,426	3,306	3,698	3,738	3	10,737	− 438
Oldham Corporation	2,157	2,513	2,137	2,122	2,416	2,298	2,214	2,760	4	10,421	+ 283
Portsmouth Corporation	2,183	2,697	2,455	2,408	2,232	2,515	2,452	2,515	4	7,914	—
Preston Corporation	796	1,037	856	896	1,213	748	964	1,005	2⅔	2,718	− 71
Provincial	2,039	2,494	2,147	2,085	2,112	2,329	2,171	2,318	29½	60,086	+ 3,397
Reading Corporation	676	799	722	691	752	784	757	767	2⅔	2,204	+ 67
Rhondda Tramways	1,088	1,513	1,238	1,110	868	1,242	1,195	1,206	16	18,429	+ 582
Rochdale Corporation	1,686	1,911	1,541	1,539	1,600	1,757	1.637	2,210	3¼	6,082	+ 88
Rotherham Corporation	1,018	997	976	978	1,031	1,299	1,314	1,697	3⅔	5,342	+ 1,371
Salford Corporation	4,596	4,856	4,840	4,959	5,527	5,193	5,011	5,665	3⅔	18,472	+ 903
Sheffield Corporation	8,117	8,986	8,226	8,034	9,936	9.802	9.733	10,004	4	40,408	+ 5,968
Southampton Corporation	1,176	1,479	1,297	1,362	1,443	1.505	1,439	1,391	2⅔	3,900	− 236
Southend-on-Sea Corporation	643	1,077	754	748	599	640	648	639	3	1,765	− 337
South Metropolitan Tramways	*	...	...	...	...	...	...	...	—	—	—
South Shields Corporation	772	830	691	697	742	714	754	824	3¼	2,462	+ 77
Sunderland Corporation	...	1,531	1,357	1,351	...	1.617	1,507	1,578	3	5,143	+ 17
Sunderland District	535	770	559	569	597	630	548	576	25	14,080	+ 828
Swindon Corporation	161	152	180	174	177	136	178	169	2½	482	− 24
Torquay Tramways	421	775	587	563	411	496	495	489	16	6,731	− 351
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	514	655	549	547	507	560	532	515	16	7,888	− 344
Wallasey Corporation	1,057	1,383	1,117	1,124	1,129	1,216	1,174	1,295	3¼	3,910	− 230
Walsall Corporation	656	863	633	653	742	790	776	788	17	12,522	+ 1,570
Walthamstow U.D. Council	642	1,043	778	816	622	987	942	975	3	3,088	+ 318
Warrington Corporation	430	454	424	413	464	465	474	508	3	1,386	+ 142
West Ham Corporation	2,925	3,394	2,898	3,012	2,919	3,126	3,097	3,148	2⅔	8·937	+ 84
Wigan Corporation	1,438	1,653	1,407	1,462	1,509	1,603	1,574	1,626	3	4,574	− 205
Wolverhampton Corporation	1,293	979	996	983	1,180	1,107	1,105	1,582	4	4,696	+ 671
Yorkshire (West Riding)	1,508	1,844	1,443	1,796	1,755	1,629	1,557	1,764	17	27,122	+ 2,126

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

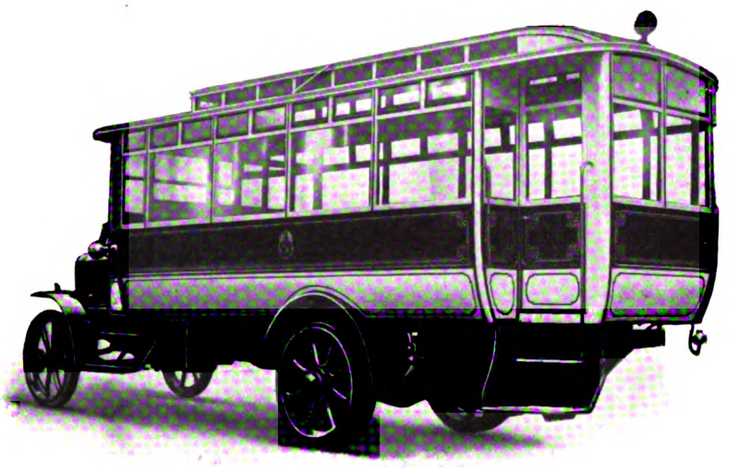
For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers).

For Places Abroad—
Thirty Shillings per annum.

Tel. No.: **2948** Gerrard.
Telegraphic Address: **"Tramigro," London.**

Amberley House, Norfolk St., W.C.

Digitized by Google



As supplied to Walsall Corporation

Daimler

Commercial Vehicles

RECENT CONTRACTS INCLUDE:

18	Vehicles	for ...	Birmingham
9	"	" ...	Walsall
11	"	" ...	Manchester
5	"	" ...	Sheffield
3	"	" ...	Rotherham
3	"	" ...	Halifax

The Daimler Company, Ltd., Coventry

Depots at London, Manchester, Nottingham, Bristol, Leeds, Cardiff, Birmingham, and Newcastle.

Digitized by Google

BRITISH NAPIER BUILT

BUSINESS VEHICLES

Railway Delays!

These are **Acute** now. Be Independent by Purchasing a

3½ TON NAPIER BUSINESS VEHICLE.

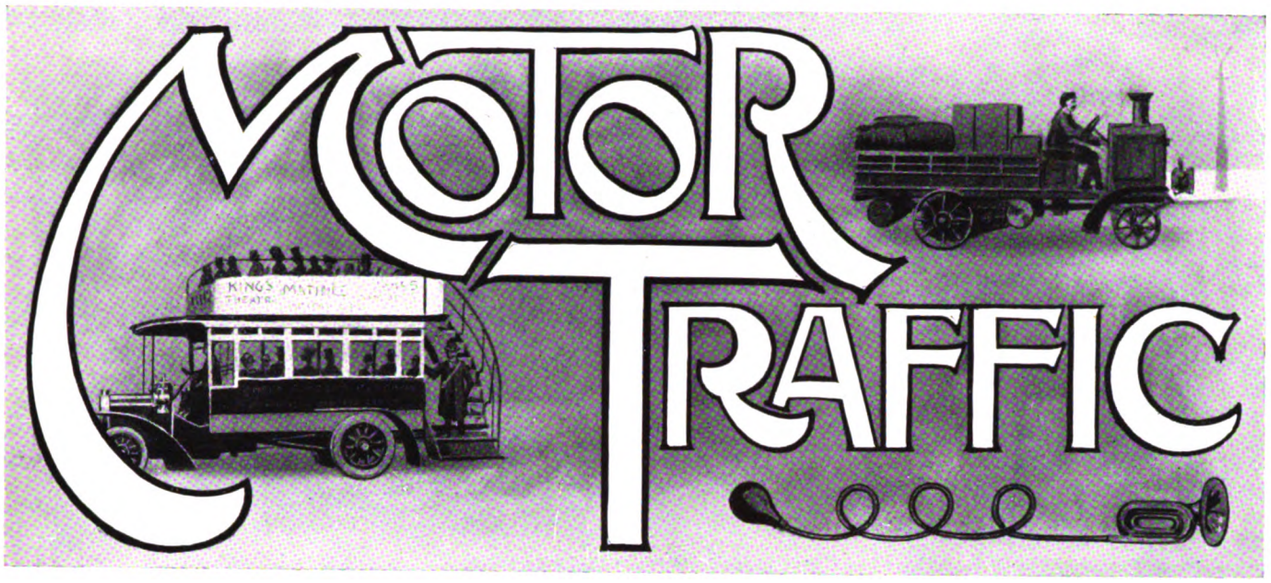
Full particulars from

D·NAPIER & SON, LTD.,

14, NEW BURLINGTON STREET, LONDON, W.

WORKS:–
ACTON, LONDON, W.

Digitized by Google



The question of how to get the fullest possible results from the use of motor transport is one of outstanding importance in view of the ever-increasing cost of fuel, whether it be coal or spirit, and of other necessaries, and the difficulties of securing suitable drivers. There is little doubt that, so far as individual effort and organisation can achieve this end, practically all that can be done is being done by owners and users of vehicles to-day, if only because circumstances have proved too strong to be resisted. If this statement be subject to any exception at all, it must be in regard to municipal vehicles as to which certain inherent conditions—which have lately been discussed to some extent in these columns—make it virtually impossible for the fullest measure of economy in operation to be obtained. It has been pointed out that it is the exception and not the rule for municipal motor vehicles to be under separate and expert control. Their purchase and upkeep are almost invariably left to departmental committees and officials, working in more or less watertight compartments. The result therefore is that municipalities tend to acquire, not homogeneous "fleets" of vehicles, but a number of small groups, each kept entirely detached one from the other, and never or rarely being interchanged. This practice is so widespread, and its wastefulness so palpable, that little or no apology is demanded for returning for a moment to the subject. Economy in the use of motor transport cannot, however, be dismissed as a matter of operating organisation alone; it is very largely also one of the purchase at the outset of the right kind of vehicle. This may possibly appear to be a somewhat elementary desideratum, but it is one of which sight is lost with more frequency than might generally be believed. To a large extent this may be due to the tendency towards standardisation in bodywork as well as chassis, which results in a trader buying a vehicle of more or less stereotyped design. This may at first sight seem to make for economy; but on investigation it will be found to have the reverse effect, inasmuch as the requirements of individual users vary to such degree that it is impossible that they can properly be met by standardised types of vehicles, no matter how skilfully they may strike a general average. To obtain the maximum service, and therefore the utmost degree of economy, it is essential that the needs of each individual purchaser should receive due attention in the type and design (shape and size of body, etc.) of the van or lorry to be supplied, and although this may perhaps result in extra expenditure being incurred in the first instance, it will prove by far the more economical plan in the long run.

* * * * * *

In municipal work the adaptability that results from having interchangeable or convertible bodies is peculiarly desirable. Except in the case of the lighter types of vans and special vehicles, there is no reason whatever why all conveyances ordered by public authorities should not, as a matter of course, be convertible to various uses. In many towns and localities this necessity is realised, but it is by no means universally the case, and upon this fact the lack of that centralised control of municipal motor fleets has considerable bearing. As a case in point, one may take a Corporation gas works, requiring a lorry for carting coal. If, as is usual, the department is left to deal with the matter independently, the probability, if not certainty, will be that they will order a vehicle of, say, 3½ tons capacity, with an ordinary open body—a lorry quite suitable for carting coal, or similar service, but nothing more. A general manager—in towns where there are tramways he would naturally be the tramway manager—having charge and control of all vehicles, and the duty of giving his employers the best possible transport service at the minimum cost, would take a wider survey. He would bear in mind the other departments—works, cleansing, and so forth—and he would aim at procuring a lorry such as would be capable of rendering assistance all round, and he would see that each of his chassis were so equipped as to be ready at all times to meet any reasonable demand from whatever quarter. Hence the value of adaptability in municipal vehicles. Thus that coal lorry would at least be provided with tipping gear. Nor is there any reason why, by specifying removable sides and end, an open platform should not be made available for cases of need, so that loads of bricks, or large blocks of stone for the works department, or loose ballast and tar barrels for the road surveyor, could be dealt with. Or, perhaps, instead of tipping mechanism being fitted, the body might be made interchangeable with a tank and sprinkler, thus achieving a double or treble purpose in another way. It is perfectly true that this latter arrangement is in no wise unknown, but the possibilities of convertible and interchangeable bodies have not been utilised to anything like the extent that might reasonably have been expected. It is obviously unsound policy to buy two chassis where one might suffice, but this error has been committed in the past to no small extent.

Digitized by Google

MOTOR TRAFFIC.

The clause contained in the Local Government (Emergency Provisions) Bill, empowering local authorities to restrict motor omnibus and similar traffic over new routes, establishes a somewhat notable precedent, despite the fact that for the momen it forms part of a mere emergency measure. We deal elsewhere in this issue with the danger to be apprehended from the proposal to leave the settlement in the hands of the local authority. The much-vexed question of heavy motor traffic on the roads can hardly be said to have been rendered any easier of solution by the effects of the war. The wear and tear upon the highways by military traffic has been so very heavy that it is to be feared that the task of putting matters right will be long and arduous and exceedingly costly. In these circumstances, the temptation to mulct the users of heavy motor vehicles with some contribution towards the outlay is bound to assert itself, and on the whole it would be as well for those concerned to be prepared for any eventualities. The clause in the Bill just referred to, however, does not deal with this point. What it actually effects is to prohibit the opening up of new routes by motor omnibuses or other public passenger vehicles, except with the consent of the local authority or the Local Government Board. Ordinary commercial or trade vehicles will not in any case be touched, whilst, so far as the class of traffic specified is involved, it would seem that a safeguard in the shape of an appeal to he Local Government Board, is provided in case of palpably unreasonable refusal of consent by a local body to a new service that might be the means of affording valuable facilities to the public. It must, however, in candour be said that there has been no little cause for complaint in a contrary sense.

RESTRAINT OF MOTOR PASSENGER SERVICES.

In the House of Lords, on April 18, the Earl of Northbrook, on the consideration of the Local Government (Emergency Provisions) Bill, said :—The object of the clause standing in my name on the paper is to enable local authorities to effect economy during the war in the maintenance and repair of roads, or, at any rate, to prevent for the time being an unnecessary additional amount of traffic being put on their roads, with a consequent increase of expenditure. Your lordships are aware that the annual cost in respect of main roads has, since the introduction of mechanically-propelled vehicles, greatly increased, and is now the largest charge on the general purposes account of County Councils. It is at present open to any individual or private company, without the consent of the local authorities, to run omnibuses or other similar carriages plying for hire over the roads, for the repair and maintenance of which the local authorities are liable. This practice has widely extended, is increasing, and has increased since the war. I have a list of 30 counties in England and Wales in which motor and other omnibuses are running. This heavy traffic puts a heavy charge upon the county ratepayers, while the owners of the omnibuses contribute little, and in many cases nothing, to maintenance of the roads. That is a question for future consideration. The clause which I am moving is an emergency measure, and its operation would continue only during the war or for such period not exceeding one year after, as the Local Government Board might fix. The clause does not propose to interfere with existing omnibus routes. I move to insert, after Clause 19, the following new clause :—

(1) Notwithstanding anything in any statute it shall not be lawful after the passing of this Act for any omnibus to ply for hire on or use any route which has not been regularly used by omnibuses plying for hire within 12 months prior to the first day of March, 1916, except with the consent of the highway authority or, if more than one, every highway authority liable for the maintenance and repair of the highways along which the route runs, which consent may be given on such conditions as the highway authority may consider fit, or, if such consent is unreasonably refused, without the consent of the Local Government Board; and if any person drives an omnibus or allows an omnibus to be driven along any route in contravention of this provision, he shall, on summary conviction, be liable to a fine not exceeding £5 and to a further penalty not exceeding 40s. for every mile travelled by every omnibus in contravention of the provisions of this section, all penalties recoverable under this section to be paid into the funds of the highway authority concerned.

Provided that nothing in this section shall apply where a route is altered in consequence of the temporary diversion of traffic on account of the breaking up of any road or in pursuance of the directions of any police authority or other directions lawfully given.

Provided also that nothing in this section shall apply to any omnibus plying for hire on any route in any case where the Admiralty, Army Council, or Minister of Munitions are of opinion that an omnibus service is necessary for and is to be used solely by munition workers or other persons engaged on Government war service.

(2) This section shall not be deemed to detract from any existing powers of highway authorities in regard to omnibuses.

(3) For the purposes of this section the expression "omnibus" includes every omnibus, chars-a-banc, wagonette, brake, stage coach, or other carriage plying for hire or used to carry passengers at separate fares.

Lord HYLTON : The Government are willing to accept this clause. The safeguard that the clause contains, requiring the sanction of the Local Government Board, will probably guarantee that no unreasonable restrictions will be permitted.

The amendment was agreed to.

AMENDMENTS BY THE HOUSE OF COMMONS.

The House of Commons on May 2 considered the Lords' amendments. On a new clause, as set forth above, Sir F. BANBURY (City of London) asked whether the clause was in order.

The SPEAKER said that he would not dare to rule the House of Lords out of order.

Mr. JOYNSON HICKS (Brentford) moved to substitute two years for 12 months in the clause. He said that there was a Committee now sitting on the question of heavy motor regulations, and another one was to be set up to consider the whole question of roads. A large number of omnibuses had been taken off the roads to be used on war service in France. The object of his first amendment was to put things back to the pre-war basis. His second and third amendments were to give an appeal to the Local Government Board in the case of unfair conditions being imposed. His fourth amendment was to meet the case where munition workers were conveyed by omnibuses not plying for hire.

Mr. HAYES FISHER (Parliamentary Secretary, Local Government Board) said that the clause was supported by the County Councils. The Local Government Board had no objection to it. This was an emergency Bill, which would last only for one year after the war. Highway authorities had been very heavily hit by the road traffic ; grants could now be obtained from the Road Board. The highway authorities were naturally seeking to limit the user of the roads to a certain extent, and it was proposed that no omnibus company should ply for hire on any new routes, but they would be allowed to use routes on which they had plied for 12 months, or for two years if the present amendment were accepted. He proposed to accept all the amendments of Mr. Joynson Hicks.

Mr. DENNISS (Oldham) objected to the clause on the ground that it endeavoured to establish the principle of local veto over traffic. If there was to be a veto it should be given to the Local Government Board. The fact that we were superior to the rest of the world in heavy motor traffic was because that trade had not been fettered by the local authorities, as light motor traffic and tramways had been by the State and local authorities.

Mr. Joynson Hicks' amendments to the clause were agreed to, and the clause as amended was approved.

DAIMLER OMNIBUSES FOR BIRMINGHAM AND WALSALL.

On the following page are reproduced photographs of one of the eighteen 40-H.P. Daimler omnibuses ordered by Birmingham Corporation Tramways Department and one of nine single-deck Daimlers for which the Walsall Tramways Committee have placed an order.

The popularity of the single-deck omnibus is steadily increasing, especially in districts where low railway bridges render the roads impassable for double-deck conveyances. Their appearance is more pleasing than is the case with the chassis fitted with a double-deck body, though of course they do not offer the fresh air and sight-seeing attractions of the latter. The single-deck body, however, is very roomy, and accommodates more passengers than is the case with the saloon of the double-deck machine.

Other particulars are as follow :—

	Birmingham.	Walsall.
Height over all ...	13 ft. 1 in. ...	10 ft. 7 in.
Length ,, ,, ...	24 ft. 2½ in. ...	24 ft. 11½ in.
Width ,, ,, ...	6 ft. 11 in. ...	7 ft. 2 in.
,, internal ...	6 ft. 1 in. ...	6 ft. 9 in.
Passengers outside	18 and 2 ...	2
,, inside	15 ...	26
,, total...	35 ...	28

An "Allen" type body is fitted to the Birmingham omnibus. The seating accommodation in the interior is by half-length longitudinal seats in the rear, and cross-section seats forward.

As motor manufacturers "controlled" by the Ministry of Munitions are only able to supply commercial vehicles to firms engaged in Government work, special permission had to be obtained before the Birmingham and Walsall Corporation orders could be executed.

Digitized by Google

MOTOR TRAFFIC.

One of Nine 40-h.p. Daimlers for Walsall Tramways Department.

First of Eighteen Daimlers with "Allen" Bodies Ordered by Birmingham Corporation.

Digitized by Google

MOTOR TRAFFIC.

ROAD TRACTION BY PETROL, STEAM AND ELECTRIC VEHICLES.

A paper bearing the above title was read by Mr. G. Martin Gamble at a meeting of the Yorkshire Association of Students of the Institution of Civil Engineers at the Cutlers' Hall, Sheffield. Mr. Gamble observed that the transport difficulties resulting from the war made the consideration of the value of the different forms of traction important. Motors would serve a radius of thirty or forty miles per day, as compared with twelve miles for horse haulage. there would be ample supply of petrol for motor purposes at a maximum price of 1s. a gallon.

The elimination of the boiler in a petrol machine did away with the depreciation of this part, and saved the time occupied in cleaning and repairing. Again, a petrol machine was always available for service at short notice, whilst with steam wagons at least one hour was taken up in raising steam, half an hour at night in withdrawing or banking fires, and half an hour in replenishing water tank. This loss was equivalent to fifty ten-hour days per annum. Another item of economy possessed by the petrol vehicle was that it could be stopped during long waits without loss of fuel.

ESTIMATED RUNNING COSTS.—STEAM AND PETROL VEHICLES.

	Petrol wagons. Rubber tires.				Tractor.	Steam wagon. Steel tires.	Steam wagons. Rubber tires.	
Net load capacity	2 tons.	3 tons.	4 tons.	5 tons.	5 tons.	10 tons with trailer.	3 tons.	5 tons.
Cost—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Chassis without tires	525 0 0	610 0 0	700 0 0	750 0 0	550 0 0	550 0 0	500 0 0	550 0 0
Tires guaranteed for 10,000 miles	40 0 0	55 0 0	60 0 0	65 0 0	—	—	65 0 0	100 0 0
Body and equipment	35 0 0	40 0 0	45 0 0	50 0 0	—	45 0 0	40 0 0	50 0 0
Trailer and equipment	—	—	—	—	70 0 0	55 0 0	—	—
Total	600 0 0	705 0 0	805 0 0	865 0 0	620 0 0	650 0 0	605 0 0	700 0 0
Mileage—								
Per day	40	40	40	40	20	25	35	30
	90	90	90	90	30	35	55	50
Per week of five working days	200	200	200	200	100	125	175	150
	450	450	450	450	150	175	275	250
Per annum of fifty working weeks	10,000	10,000	10,000	10,000	5,000	6,250	8,750	7,500
	22,500	22,500	22,500	22,500	7,500	8,750	13,750	12,500
Standing charges—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Interest at 5 per cent. per annum	30 0 0	35 0 0	40 5 0	43 5 0	31 0 0	32 10 0	30 5 0	35 0 0
	30 0 0	36 0 0	40 5 0	43 5 0	31 0 0	32 10 0	30 5 0	35 0 0
Depreciation on vehicle, less tires	84 0 0	97 10 0	111 15 0	120 0 0	62 0 0	81 5 0	54 0 0	60 0 0
	84 0 0	97 10 0	111 15 0	120 0 0	62 0 0	81 5 0	67 10 0	60 0 0
Insurance	15 0 0	18 0 0	21 0 0	22 0 0	16 0 0	17 0 0	15 0 0	17 0 0
	15 0 0	18 0 0	21 0 0	22 0 0	16 0 0	17 0 0	15 0 0	17 0 0
Running charges—								
Wages of driver at 35s. and 45s. per week	91 0 0	91 0 0	91 0 0	91 0 0	91 0 0	91 0 0	91 0 0	91 0 0
	117 0 0	117 0 0	117 0 0	117 0 0	91 0 0	117 0 0	117 0 0	117 0 0
Wages of assistant at 24s. and 28s. per week and 26s.	—	—	—	—	—	62 8 0	62 8 0	62 8 0
	—	—	—	—	—	72 6 0	67 12 0	67 12 0
Fuel (petrol at 1s. 6d. per gal., coke at 1s. per cwt.)	75 0 0	88 5 0	107 5 0	125 0 0	33 10 0	50 4 0	39 1 0	43 10 0
	168 15 0	198 10 0	241 0 0	281 5 0	50 4 0	70 6 0	61 7 0	72 11 0
Rubber tires	40 0 0	55 0 0	60 0 0	65 0 0	—	—	56 17 0	75 0 0
	90 0 0	123 15 0	135 0 0	146 5 0	—	—	89 7 0	125 0 0
Maintenance and repairs	25 0 0	30 0 0	40 0 0	50 0 0	28 0 0	42 0 0	35 0 0	35 0 0
	50 0 0	60 0 0	80 0 0	100 0 0	42 0 0	59 0 0	40 0 0	60 0 0
Lubricants and sundries	8 0 0	10 0 0	15 15 0	35 0 0	10 10 0	15 13 0	15 9 0	17 2 0
	17 5 0	22 0 0	20 15 0	45 5 0	14 16 0	21 13 0	22 19 0	27 17 0
Total annual cost	368 0 0	425 0 0	487 0 0	781 0 0	272 0 0	392 0 0	389 0 0	436 0 0
	572 0 0	672 0 0	781 0 0	537 0 0	307 0 0	471 0 0	511 0 0	597 0 0
Cost per mile run (approximate)	d. 8.7	d. 11.2	d. 11.7	d. 8.3	d. 13.5	d. 15	d. 10.6	d. 13.9
	d. 6	d. 7.2	d.	d. 12.8	d. 9.8	d. 12.9	d. 8.9	d. 11.4
Cost per ton-mile—								
Loaded both ways with full load	4.3	3.7	3	2	2.7	1.5	3.5	2.8
	3	2.4		2.5	1.9	1.2	2.9	2.3
Loaded one way only with full load	7.8	6.8	5.4	3.6	4.9	2.7	6.3	5.1
	5.4	4.4		4.5	3.6	2.3	5.4	4.2
Depreciation, per cent. per annum	15	15	15	15	10	12½	10	12½
	15	15	15	15	10	12½	12½	12½
Estimated fuel consumption, miles per gal., lb. per mile	10 m.p.g.	8½ m.p.g.	7 m.p.g.	6 m.p.g.	15 lb. per mile	18 lb. per mile	10 lb. per mile	13 lb. per mile
	10 m.p.g.	8½ m.p.g.						

NOTE.—The cost per ton-mile loaded one way only is approximately 10 per cent. less than double the cost loaded both ways, as there is less wear and tear on tires and less fuel used when running empty. Management and establishment charges are not included in the above figures.

ELECTRIC VEHICLES.

	Author's estimate.			Mossay and Co.'s estimate.			Wolseley Motor's estimate.			Edison Accumulator's estimate.		
Net load capacity	2 tons.	3½ tons.	5 tons.	1½ tons.			2 tons.	3½ tons.	5 tons.	2 tons.	3½ tons.	5 tons.
Cost—	£ s. d.	£ s. d.	£ s. d.									
Chassis, less battery and tires	465 0 0	620 0 0	635 0 0				—	—	—	—	—	—
Battery (approximate)	165 0 0	185 0 0	240 0 0		—		—	—	—	—	—	—
Tires, guaranteed 10,000 miles	35 0 0	50 0 0	65 0 0		—		—	—	—	—	—	—
Body and equipment	35 0 0	40 0 0	50 0 0		—		—	—	—	—	—	—
							—	—	—	—	—	—
Total	700 0 0	895 0 0	990 0 0		—		—	—	—	—	—	—
Mileage—												
Per day	30	25	20	—	—	—	40	40	35	50	45	40
	50	45	35									
Per week of five working days	150	125	100	—	—	—	—	—	—	300	270	240
	250	225	175									
Per annum of fifty working weeks	7,500	6,250	5,000	6,000	8,000	12,000	—	—	—	—	—	—
	12,500	11,250	8,750									
Cost basis	Per annum.			Per annum.			Per week.	Per mile.	Per week.	Per mile.	Per week.	Per mile.	Per week.	Per mile.	Per week.	Per mile.	Per week.	Per mile
Standing charges—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	d.	£ s. d.	d.	£ s. d.	d.	£ s. d.	d.	£ s. d.	d.	£ s. d.	d.
Interest at 5 per cent per ann	35 0 0	35 0 0	44 15 0	44 15 0	49 10 0	49 10 0	14 10 0	14 10 0	14 10 0	--	—	—	—	—	—	—	—	—
Depreciation at 10 per cent. on vehicle, less battery and tires	50 0 0	50 0 0	66 0 0	66 0 0	68 10 0	68 10 0	50 0 0	50 0 0	50 0 0	18 7	.93	1 2 9	1.14	1 6 3	1.506	1 12 9	1.32	1 19 8	1.76	2 4 0	2.23
							20 0 0	20 0 0	20 0 0	6 5	.32	0 7 7	.38	0 8 0	.46	0 4 0	.16	0 4 0	.18	0 4 0	.2
Insurance	12 0 0	12 0 0	13 0 0	13 0 0	14 0 0	14 0 0															
Running charges—																					
Wages of driver	83 4 0	83 4 0	83 4 0	83 4 0	83 4 0	83 4 0	78 0 0	78 0 0	78 0 0	1 8 0	1.4	1 8 0	1.4	1 8 0	1.6	1 10 0	1.2	1 10 0	1.33	1 10 0	1.5
Energy at 1d. per unit	28 2 6	46 18 0	31 5 0	56 5 0	33 7 0	58 6 0	20 0 0	26 10 0	40 0 0	0 10 0	.5	0 13 4	.67	0 13 1	.75	1 10 0	1.2	1 18 6	1.71	2 8 0	2.4
Maintenance of battery	61 17 6	103 2 0	57 6 0	103 2 0	60 0 0	105 0 0	45 0 0	60 0 0	75 0 0	1 2 7	1.13	1 9 3	1.46	1 17 6	2.14	0 4 1	.16	0 5 6	.24	0 6 7	.33
Maintenance of chassis and body	18 15 0	31 15 0	24 15 0	45 0 0	26 0 0	45 10 0	16 5 0	21 15 0	32 10 0	0 12 0	.6	0 16 0	.8	0 14 0	.8	0 12 2	.49	0 13 2	.59	0 13 4	.67
Tires	26 5 0	43 15 0	31 5 0	56 5 0	32 10 0	40 12 0	20 0 0	25 10 0	40 0 0	0 17 7	.88	1 5 7	1.28	2 7 5	2.26	0 16 1	.64	0 10 9	.88	1 2 4	1.12
Lubricants and sundries	2 16 0	4 6 0	3 10 0	5 9 0	3 19 0	6 8 0	--	--	--	—	—	—	—	—	—	—	—	—	—	—	—
Total cost	318 0 0	410 0 0	355 0 0	473 0 0	371 0 0	471 0 0	265 15 0	296 5 0	350 0 0	5 15 2	5.76	7 2 6	7.13	8 14 3	9.516	6 9 1	5.17	7 10 7	6.09	8 9 0	8.45
Cost per mile run (approx.)	d. 10.1	d. 7.8	d. 13.6	d. 10	d. 17.8	d. 12.8	d. 10.5	d. 8.8	d. 7												
Cost per ton-mile—																					
Loaded both ways	5	3.9	3.9	2.8	3.5	2.5	—	—	—												
Loaded one way only	7.6	5.8	5.8	3.3	5.3	3.8	—	—	—												
Estimated current consumption per mile	.9 units	1.2 units	1.5 units	—	—	—															
Estimated battery upkeep per mile	1.98d.	2.2d.	2.88d.	—	—	—															

NOTE.—The cost per ton-mile loaded one way only is approximately 25 per cent. less than double the cost loaded both ways, as there is less wear and tear on tires and current consumption proportionately less. Management and establishment charges are not included in the above figures.

For short distances there would be two handlings of the load by motor as against four or more by rail; there would be greater safety in transport, no terminal delays, the goods would always be under the care of the owners or their men, and frequently two removals could be made by motor while one was being effected by rail, which would make up for the higher cost in transport by the former.

Steam lorries were described as being preferable to tractors in towns, whereas the tractor was of most value when working in soft or unmade ground. Dealing with the criticism of motor vehicles on the ground of the dearness of petrol, it was pointed out that the price of coal had also gone up. It was believed that after the war

Electric battery vehicles had lately come into somewhat extensive use, and for town use or suburban delivery work they gave promise of meeting an undoubted demand for economy and operation compared with horse traction, and in some cases with other forms of mechanical traction.

To secure the highest efficiency it was not sufficient to scrap the horses and put a motor to work on precisely the same lines. The influences of higher speed and load factors demanded that due care and thought be given to the possibilities of reducing the number of stops and unnecessary delays in loading and unloading, etc. Careful consideration of the routing of vehicles where possible to avoid

Digitized by Google

MOTOR TRAFFIC.

traversing the same ground empty, unnecessarily, and the provision of special or interchangeable bodies, combined with adequate facilities for rapid loading and unloading, would well repay any time or money spent on the subject. Careful driving at reasonable speeds, combined with thorough daily inspection and prompt renewals of worn parts, would give a handsome return in reliability and economical operation.

Running costs in pence per mile, unless accompanied with details as to how they were arrived at, were liable to be misleading. The estimates shown in the accompanying tables were purposely made out in detail so that any particular item could be varied to suit some other circumstances. These figures could only be taken as general indications, for seldom were two cases precisely alike. Two columns for various mileages per day were given for each size of vehicle, these mileages representing approximately the limits of a normal day's run, the lower figures being in the neighbourhood of the minimum mileage at which it paid to run the vehicle under average circumstances. The allowances provided under the various headings were upon rather more generous lines than was usual in manufacturers' catalogues, and were based upon present-day costs, allowing for the advance in prices of vehicles and materials due to the war.

Establishment charges were not provided for in the figures given, as these varied considerably, depending upon whether the vehicle was a single lorry in a large undertaking, or whether it was the sole stock-in-trade of a haulage contractor. In the former case, the motor costs would form a very small fraction of the establishment charges, whereas in the latter they bore a very much higher ratio. It was largely on this account that haulage contractors had to charge much higher rates for hire than the figures shown in the tables on page 374.

In the discussion following the reading of the paper, Mr. W. J. Hadfield, city surveyor of Sheffield, said his experience was that a 5-ton petrol machine would save £200 per annum as compared with horse haulage when the work was fairly regular.

BRITISH MAGNETOS.

Two Requests by the Manufacturers.

The manufacture of magnetos is dealt with in the recently issued report of the Sub-Committee of the Advisory Committee to the Board of Trade in respect to measures for securing after the war the position of certain branches of British industry. In 1913 the imports of magnetos were estimated at £500,000. The report observes that prior to the war the trade in magnetos was virtually monopolised by the Bosch Company, Stuttgart, and at the outbreak of the war there were no manufacturers in this country, where the normal demand was about 5,000 magnetos per week. Since then the demand has substantially increased, especially for military and naval use. "A number of British firms," the report states, "took up the manufacture, and, with the assistance of Sheffield in respect of the production of magnet steel, they have succeeded in making magnetos which have passed the Government tests, and are asserted to be as good as the Bosch products. The firms are receiving large Government contracts, and there seems to be no doubt that, in this instance (which is specially important as being one of a "key" industry), a considerable British manufacture could be built up which *inter alia* would guard against a repetition of the serious difficulties caused in the early stages of the war by our dependence on foreign supplies. The one obstacle is the reluctance of the firms concerned to commit themselves to further capital outlay, and the unwillingness of outside capital to come to their assistance, unless assured of some security against the strenuous competition of the Bosch concern after the war.

"The representatives of this industry asked that Government assistance might be afforded them by

"(1) An undertaking that the Government departments concerned in motor tranport and the air services would undertake to make use only of British magnetos made (so far as practicable) only of British parts, such undertaking to be for a term of years after the war ends; and

"(2) The extension to all magnetos of the import duty of 33⅓ per cent. imposed upon magnetos imported as parts.

"We reported to the President of the Board of Trade that, in view of the importance of the manufacture of magnetos for military and naval purposes, its position as a 'key industry,' the efforts which the manufacturers have made, and the undoubtedly severe competition from the powerful Bosch interests which they will have to encounter after the war, we were unanimously of opinion that Government assistance might be given in the two forms desired by the industry."

LONDON OMNIBUS WORKING IN 1915.

The following calculations relating to the receipts and working expenses of the London General Omnibus Company for the year ended December 31, 1915, have been sent to us by a correspondent, who states that they are based upon the company's recently issued report and accounts :—

Gross receipts (traffic, advertising, and sundries)	£2,882,410
Expenditure	£2,412,142
" percentage of receipts	83·68%
Depreciation for plant, etc., and reserve fund	£198,748
" percentage of receipts	6·9%
" " capital	6·31%
Total expenses	£2,610,890
" percentage of receipts...	90·58%
Gross balance on working	£271,520
" " percentage of receipts	9·42%
" " " capital	8·62%
Interest and balance brought forward	£114,987
Gross available balance	£386,507
" " percentage of receipts	13·41%
" " " capital	12·27%
Disposal of Balance:—	
Interest on stock and other expenses	£141,413
Percentage of receipts	4·91%
" balance	36·59%
" capital outlay	4·49%
Dividend	£221,856
Percentage of receipts	7·69%
" balance	57·4%
" capital outlay	7·04%
Balance carried forward	£23,237
Percentage of gross balance	6·01%
Capital outlay	£3,150,480

	£	Percentage of Total Expenses.	Percentage of Gross Receipts.
Traffic expenses	1,326,781	55·0	46·03
Maintenance	935,451	37·8	32·45
General expenses	149,911	6·21	5·20
Depreciation	23,748	·99	·82
Reserve	175,000	—	6·08
Balance	271,520	—	9·42

The expenses per omnibus mile were stated in our issue of February 6 to have been at the rate of 8¾d., an increase of 1¼d. per omnibus mile compared with the year 1914.

NAPIER MODEL FOR HAULAGE.

Messrs. W. H. Gubb and Sons, of Ilfracombe, are engaged on urgent Government work, and to face the difficulty of railway transport have felt the necessity of an efficient road vehicle. Consequently they recently obtained a 3½-ton Napier business vehicle, which is illustrated above. As will be seen from the illustration, the War Office type body has been used, and by means of a tarpaulin a closed body can be provided.

National Road Congress and Exhibition.—In the course of the report presented at the annual meeting of the County Councils Association, it was stated that although the National Road Congress and Exhibition took place during an abnormal period, the result was satisfactory beyong expectation. The attendances, both at the conference and the exhibition, were very large, 298 local authorities being represented by 881 delegates, including Belgians, while many manufacturers and interested members of the general public were present.

Digitized by Google

MOTOR TRAFFIC.

LIVE AXLES FOR COMMERCIAL VEHICLES.

A paper bearing the above title was recently read before the Institution of Automobile Engineers by Mr. Geo. W. Watson. The author stated that his purpose was to present a *résumé* of up-to-date practice relating to the design of live back axles for commercial vehicles for load capacities of two tons and upwards. He trusted that the paper (extracts from which are given below) might suffice as a basis for discussion with a view to the improvement of so vital a unit in the anatomy of a commercial vehicle. Continuing, he said :—

"Any information that is obtainable in regard to experience with the thousands of vehicles with the Expeditionary Force would appear to show that no small percentage of the troubles experienced has related to back axles. British designers and constructors will be pleased to learn that comparatively few failures have occurred with axles entirely of home design and manufacture.

Duties of a Live Axle.—"A live axle has four important duties to perform ; firstly, it has to carry a large part of the chassis load, plus a still larger part of the weight of the body and the useful load ; secondly, it has to transmit the engine power to the wheel rims and tires ; thirdly, it has to transmit the tractive effort, or push the vehicle along the road ; and fourthly, the containing casing, or forging, has to resist the torque due to the drive ; in some axles this casing has also to resist the braking load.

" The simplest form of live axle is, of course, that used on the majority of steam wagons. This consists, primarily, of a straight shaft of steel running in axle boxes which carry the rear bearing springs ; one of the road wheels is keyed, or otherwise secured to one end of the shaft, whilst the other wheel, freely mounted on the end of the shaft, is driven through a sleeve from a differential gearing. This simple form of live axle, however, has its limitations ; whilst being the cheapest to construct, it does not easily lend itself to any but a single-chain or spur-gear type of drive, and as the main shaft must perform all the three duties named, it follows that the direction of stress in the material will be continually changing all the time the vehicle is running. Consequently, it is neither practicable nor convenient to employ this form of axle for other than comparatively slow moving vehicles.

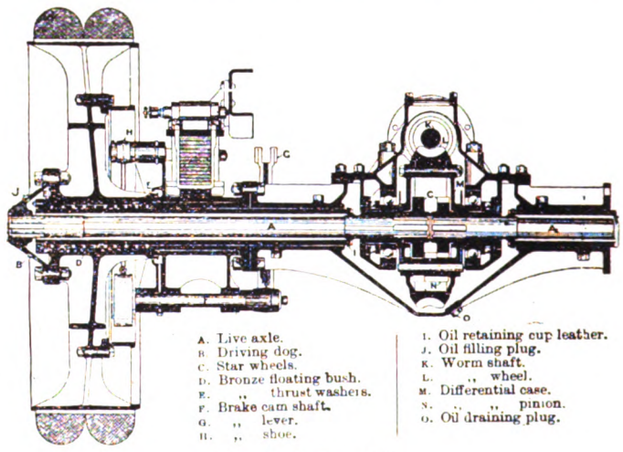
" On the majority of petrol vehicles the type of live axle is such that for the purpose of detailed consideration the complete unit can be divided into two distinct parts : (a) the outer casing, or forging, which carries the imposed load, and may be likened to a beam supported in the hubs of the road wheels and loaded at the two spring flats ; (b) the driving shafts, through which the power is transmitted to the wheels. There is another type used on certain vehicles which are partly or wholly of American origin, of which the Sheldon axle may be taken as an example. In this the casing acts as a housing for all the bearings and gears, while the differential shafts carry the bending stresses due to the load and tractive effort, in addition to the torsional stresses due to the drive, but as the differential gear cage is mounted in bearings within the main casing, the differential shafts are not called upon to take the bending load due to the worm drive. British builders of live axle commercial vehicles generally have adopted the first-named type of axle."

The Solid Forging Axle.—Of the " solid forging " axle the author said he would not venture to assert who was the first to use that type. The Leyland Company, however, had long used one form on their petrol vehicles. A better form of this axle, in his opinion, was the Pagefield. For axles in which the axis of the differential gear was coincident with that of the road wheels, it was convenient to make the axle forging in the shape of a double-shafted banjo, in the manner long used by the Maudslay Company. The general impression was that this company were the first to use this form of axle, but the author recalled that in 1906, or 1907, Thornycrofts showed such a worm-driven axle at Olympia ; that axle was then scoffed at because the load-carrying member, having originally been made for a bevel-driven axle, had been laid on its side and adapted for a worm-drive. What was ridiculed then had become the standard practice with some of our foremost builders of commercial vehicles. This kind of axle when laid upon its side was not in its best position for taking imposed loads, and was liable to excessive deflection under such loads. Although the horizontal disposition of the banjo was not the most favourable so far as imposed vertical loads were concerned, it was not necessarily the worst having regard to all the conditions which have to be met. For instance, the horizontal thrust from a central torque-thrust member, due to the tractive resistance, might conceivably impose a greater bending moment on the axle than that due to the vertical loads. Such conditions would arise whenever the vehicle be driven, with full load, up gradients steeper than 1 in 7.

Built-up Axles.—Adverting to four forms of built-up axles, which were illustrated, the author said that only one could safely be used without a tie bar or truss. With the exception of one, these axles depended to a certain extent for strength and rigidity upon steel tubes which were forced into one part under hydraulic pressure and spigot into the central casing, in this way stiffening up the connection between the respective parts. The necessity for the careful fitting of this tube was long ago impressed upon designers in this country, who had also found that solid drawn or extruded steel tubes for this purpose could not be relied upon. The author understands that the London General Omnibus Company in the " B " type axles make these tubes from solid bars of nickel steel. This axle was illustrated and described in Mr. T. B. Browne's paper on " The London Motor Omnibus Service," read at the summer meeting in the United States in 1913.

Axle Gearing.—Worm-driven axles appeared to be increasing in favour, and probably at least two builders of subsidy vehicles who now employed double-reduction axles would also be using worm drive had the original War Department specification permitted. It had proved to be both a highly efficient and constantly efficient means of power transmission, it was silent in operation, lent itself to a symmetrical design of casing, and—a point which was of great importance—made for a cheaper axle than one produced with double-reduction gears.

For vehicles intended for use on paved or good macadam roads, the author advocated the worm drive for all axles up to 6 tons limit of axle weight, but for heavier and slower-moving vehicles he considered the double-reduction type to be the better, particularly if the differential gear be mounted on the crown wheel shaft and the final drive taken through two pairs of spur gears. If any future



Dennis 3-Ton Axle.

specification issued by the War Office called for increased ground clearance the worm drive might not be acceptable, because it was not practicable to make a worm wheel as small in diameter, for a given gear ratio and load, as might be given to the final gear wheel of a double-reduction axle.

Driving Shafts and Bearings.—Alluding to driving shafts, the author stated that since the adoption of splined shafts, with broached gears and couplings, many old weak spots in axles had disappeared, but many new difficulties, chiefly in connection with the fit of the splines, and the necessary corrections due to distortion during heat treatment, had taken their place. There was great need for a very close interchange of views on these points, and a paper on the subject would no doubt prove of considerable value, and be greatly appreciated by members.

The use of ball or roller bearings on live axles had now become very general, except for the road wheels and differential bearings. For these two purposes there appeared to be ample justification for the retention of plain bearings ; especially did this apply to road wheels, in the hubs of which floating bushes had proved that they were much better suited to the rough usage of commercial service than any tried form of roller or ball bearing. A wheel with floating bushes was easily and quickly replaced in the event of tire damage, and if properly made and fitted such a bush offered very little more friction than a ball-bearing hub of equal load capacity, except when starting from rest.

American constructors were now making great use of Timken taper roller bearings, which were designed to allow of adjustment. It was to be hoped that any member who could speak from personal

Digitized by Google

MOTOR TRAFFIC.

experience extending over two years without replacements would not fail to give his views on the matter.

Lateral Adjustments.—The Tie Bar.—Referring to lateral adjustments, the author observed that no matter how carefully each part of an axle might be machined, some form of end-wise adjustment would be found necessary when an axle was being erected. This arose chiefly from the fact that all dimensions must be taken from the pitch line of the bevel, or worm, gears. Many forms of adjustment had been suggested, but the author was of the opinion that there was but one practical form—the plain mild steel washer of suitable thickness. Such washers might be stocked in about a dozen sizes. Dealing with the tie bar or truss, the paper proceeded :—

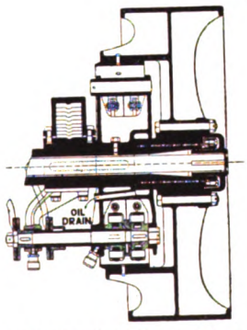
"A tie bar is a source of weakness in a commercial vehicle axle, for the simple reason that it cannot be adjusted to balance the bending moment set up in the axle by the imposed load at more than one point. It is only necessary to picture a vehicle travelling over a very bumpy road, when the axle may momentarily be relieved of the imposed load, to realise what may happen ; the casing may be dangerously stressed in a reverse direction by the tension of the tie rod, or, when the load again rests on the axle, the tie rod itself may suffer as a result of the suddenly increased tension. Generally, and as the present conditions in France have shown, it is the tie rod that gives out first, but injury to the axle frequently follows.

"An axle should be so designed and made that its strength is sufficient without the doubtful and extraneous aid of a tie rod ; that this can be done has been demonstrated by several makers of repute. Considerations of weight, however, as in the case of a London omnibus, more or less force the designer to the use of tie bars, but vehicles with such axles are by no means suitable for country or provincial service where road surfaces may not be so good as in London, unless they carry greatly reduced loads and are run at lower speeds."

Torque and Thrust.—In a reference to torque and thrust the author said that the necessity for some means of transmitting the tractive effort from the axle to the main chassis frame, and for resisting the reaction of the gear drive upon the axle body, or casing, is obvious. There is, however, great diversity of opinion as to the best means of attaining these results.

The triangular method was probably the best arrangement that could be fitted, at any rate for loads of 3 tons and upwards, as it left the joints accessible, and the axle took the thrust load near the spring seats, thus minimising the bending moment on the axle or casing.

The system most favoured by the author was that with one or two parallel torque bars, leaving the thrust to be taken by the springs. It was simple and practical, and ensured a minimum bending moment on the axle ; further, it did not ask too much of the springs. The author had found this arrangement very satisfactory for passenger vehicle work, as it tended to reduced vibration, whilst the upward kick to the frame, resulting from the starting or accelerating effort each time the clutch was engaged, might be reduced to a



Straker-Squire Arrangement of Twin Brakes on Road Wheels.

negligible amount if the torque bars were anchored at a point about 4 ft. forward of the axle centre.

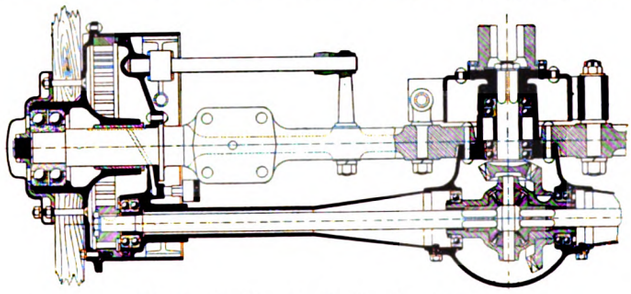
The simplest of all was that in which both torque and thrust were taken by the springs, and for a vehicle primarily intended for use on roads with good surface, and for moderate load variations over the back axle, as on a London omnibus, it might be recommended on the score of cheapness and light weight. It was, however, not very suitable for rough roads and big load variations, as on a goods lorry.

Brakes.—Axle Lubrication.—Alluding to brakes, the author said the practice of fitting both sets on the back axle, acting directly within drums fitted to the road wheels, had found many advocates since this arrangement was adopted for London motor omnibus service. There appeared to be no objection to the system provided the general design of the complete vehicle would permit of the extra width which the two brakes should occupy when arranged side by side. The brake-cam spindle should always be well supported, and in this respect the Straker arrangement of twin brakes showed that the matter had received careful attention.

"The axle," said the author, "is one of the parts which never receives attention in the way of lubrication at the hands of some drivers, to which may be added the springs. Men will tinker about for hours with an engine in the endeavour to obtain greater pulling power, whereas the engine most likely is not in the least at fault. Bent axle casings, due to slack tie rods, nearly dry bearings, binding brakes, etc., are frequent causes of the failure of a vehicle to take its full load up a given gradient on the usual gear. The general design of an axle allows of sufficient oil being carried to keep the gears and centre bearings well lubricated for about 1,000 miles of running, but slack joints and badly faced covers may often allow of enough leakage to necessitate more frequent renewals of supply.

"Many makers go to a lot of trouble to prevent the oil passing from the central casing to the wheel bearings, and rely entirely upon grease lubrication for those parts. This may have been a necessary precaution with old forms of axles, but it has been the experience of many makers that better results can be obtained by allowing leakage to occur, provided that steps are taken to catch such leakage and drain it away from the brakes and wheels as shown in the Dennis axle. A little waste oil costs less than a pair of new wheel bushes, not to mention the possible loss of service and inconvenience to the user in the case of a wheel seizure when the vehicle is miles away from home. There appears to be no reason why leaking oil should not be led to other working parts, such as brake cams, etc., and thus dispense with a number of small greasers. An axle is more likely to receive proper attention in the way of lubrication if it gives the driver no more trouble than putting an occasional pint or so of oil into the central casing."

Representative Makers of Axles.—To the author's mind the best of the double-reduction axles he had dealt with was that built by Walker Brothers, of Wigan, and fitted to their Pagefield chassis.



Burford's Double Reduction Axle.

He also referred to the Wrigley subsidy axle, the Wolseley subsidy axle, the Karrier and the Burford. Of the latter he remarked :—"Another axle of unusual design is fitted to the Burford 2-ton chassis. In this axle the load carrier is a solid forging having a comparatively small circular enlargement in the centre, through which the bevel pinion housing of the driving gear case protrudes forward. The driving gear case is thus relieved of all load-bearing stresses, excepting those due to the drive. Spur pinions on the outer ends of the differential shafts transmit the final drive to internally-toothed racks on the road wheels. These spur gears, together with the wheel brake mechanism, are completely enclosed. The footbrake drum is mounted at the forward end of the bevel pinion shaft, the cast shoes being anchored to members projecting from the axle forging."

In opening the discussion, Colonel R. E. Crompton, C.B., said the main objection to a live axle was the question of unsprung load. He did not agree with the author in saying that little was known about the damaging effect of unsprung weight. The question of damage done to roads, resulting from a combination of unsprung weight, was now being considered by the Departmental Committee of the Local Government Board. The leakage of oil was a serious matter for the tires of other vehicles. The London General Omnibus Company had got over this difficulty by the use of oil trays.

Mr. W. D. Williamson said he had been unable to get definite information as to the wearing properties of tires on chain-driven and live axle vehicles respectively. Therefore unsprung weight could not be so important as Colonel Crompton would have them believe.

Mr. O. D. North asked if it would not be possible to forge the under pan solid with the axle. The springs were capable of taking

Digitized by Google

MOTOR TRAFFIC.

the driving thrust and the torque. Springs should be long, and the point of attachment as low as possible. He had found the Dennis brake car was superior to all others. There was no better brake drum than the Straker.

Mr. G. F. WOOLLARD advised that in the matter of ball bearings the makers' lists should be adhered to if no trouble was desired. If a differential brake was used it should be put in the position shown on the Burford axle.

Mr. H. G. BURFORD endorsed Colonel Crompton's views on unsprung weight, and said it had been for that reason he favoured the form of transmission employed on the Burford car, whose axle was one-third the weight of any ordinary axle. He believed that he was the first to introduce into this country a 5-ton vehicle with ball bearings.

Major SHILSON submitted for inspection drawings of the Jeffrey quad axle. In this truck the back axle was also the steering axle, the differential having a spiral gear.

In replying, Mr. WATSON urged that while unsprung weight should be limited as much as possible, it should not be allowed to govern design He believed that in the new regulations the Local Government Board would allow greater weight for back axles.

MOTOR COMPANIES' DIVIDENDS.

HALLEY'S MOTOR COMPANY.—An interim dividend of 5 per cent., free of tax, has been declared.

ARROL-JOHNSTON, LIMITED.—A final dividend of 10 per cent. for the past year, free of tax, is recommended, carrying forward £20,485.

AUSTIN MOTOR COMPANY.—The net profits for the year were £64,322, including £413 brought forward. A dividend of 6 per cent. is proposed, writing £12,626 off preliminary expenses, placing £4,750 to reserve, and carrying forward £5,446.

ALBION MOTOR COMPANY.—The net profits for the past year amounted to £61,722. After transferring £14,000 to the reserve, the directors recommend a final dividend on ordinary shares of 10 per cent. and a bonus of 2s. per share, making 25 per cent. for the 12 months, subject to income tax, and carrying forward £19,445.

VAUXHALL MOTORS COMPANY.—The net profits for 1915 were £50,263, and £5,765 was brought forward. It is recommended writing off the balance of preliminary expenses £4,761, paying a dividend of 10 per cent., transferring to ordinary reserve to meet, among other purposes, any excess profits taxation, £25,000, and carrying forward £8,920.

CLAYTON AND SHUTTLEWORTH, LIMITED.—Mr. A. Shuttleworth presided at the annual meeting of shareholders at Lincoln, on April 20. The net profits for the year, including £15,832 brought forward, totalled £88,619, out of which £25,750 has been transferred to the reserve fund. A dividend of 7½ per cent. was sanctioned on the ordinary shares, carrying forward £22,370.

WOLSELEY MOTORS, LIMITED.—After providing for all expenses, contingencies and depreciation of buildings, etc., and after charging repairs and maintenance to revenue, the trading for the year has resulted in a net profit of £172,893. The directors recommend a dividend of 7 per cent. on preference shares and a dividend of 20 per cent. on 300,000 ordinary shares (tax free), placing £30,000 to reserve, and carrying forward £6,513.

ASSOCIATION OF BRITISH MOTOR AND AIRCRAFT MANUFACTURERS, LIMITED.—This association has been registered, the signatories being: E. Manville; F. R. Simms; F. W. Shorland; J. M. Young (Thornycroft's); R. Dennis; H. T. Vane; A. Spurrier; H. Johnson; S. Straker; H. C. B. Underdown; G. M. Young (Albion); F. Bolye Monkman. The secretary is Mr. Horace Wyatt, and the registered offices are at 173, Fleet Street, E.C. The registration necessitates the voluntary liquidation of the Associated British Motor Manufacturers, Limited, of which Mr. Wyatt will act as liquidator.

REPAIRING OF LONDON COUNTY COUNCIL ROAD MOTORS.—After consultations with the chief officers, London County Council Tramways and the fire brigade, the special committee of the London County Council on war estimates have come to the conclusion that it is not possible at present to make any alteration in the system of repairing and maintaining the motor vehicles of the two departments. Mr. A. C. L. Fell reported that the motor lorries and motor cars of the tramways department are repaired at the Belvedere Road garage, the staff consisting of seven men. As regards a suggestion that the tramways department should repair the fire brigade vehicles, he reported that the plant and shops at the Charlton depot were overcrowded with the work of the tramways.

COMMER CHARS-A-BANCS IN CANADA.

For industrial purposes the Commer chassis has long occupied a leading position in Canada and the United States, despite the competition of American machines.

A Route Traversed by Commer Chars-a-Bancs.

The favour extended to the Commer vehicle is the result of the excellent records which it is able to show in many countries besides the United Kingdom, combined with competent representation on the selling side.

Of late years the company have developed the use of their chassis in Canada for chars-a-bancs traffic, for which there is great scope. The extensive use of the Commer car for this purpose in Ottawa

Commer Chars-a-Bancs in Ottawa.

alone is shown by the view on this page of the vehicles drawn up in the neighbourhood of the Parliament buildings.

Another illustration gives an indication of the hilly routes that Commer chars-a-bancs traverse.

CITY OF LONDON CORONER AND ACCIDENT PREVENTION.—In his annual report for 1915, Dr. Waldo, the Coroner for the City of London and Southwark, states that he held inquests on 63 traffic fatalities, the highest number since the introduction of motors. The increase synchronises with the darkening of the streets dating from October, 1914, and he advises the adoption of the following preventative measures:—(1) More street refuges—including such in broad streets along which tramcars run. (2) More police, stationed especially at traffic crossing points. (3) More lifeguards or fenders—at least in the shape of sideguards for hind wheels—for all heavy motors

Digitized by Google

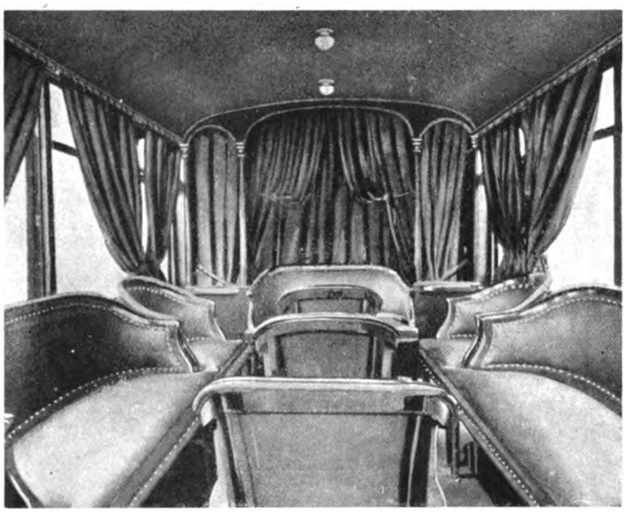
MOTOR TRAFFIC.

FUNERAL OMNIBUSES.

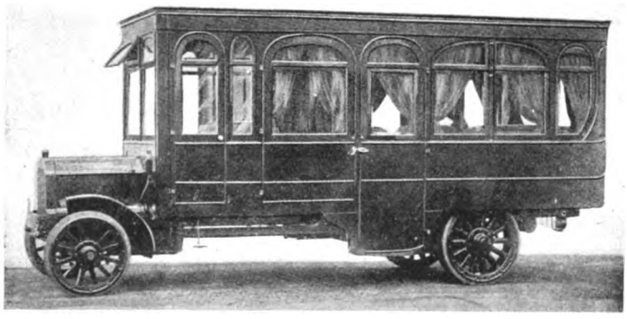
Motor hearses and motor cars, the latter accommodating two or four persons besides the casket, are not unknown in this country. Perhaps the first example of this form of service was given by the Bristol Tramways and Carriage Company, which has long possessed an admirable motor department. There is scope for an enlargement upon their efforts by the numerous motor transport companies in other parts of the country.

In carrying out this work, there is hope that the companies will not only benefit their proprietors, but will be giving the most powerful impetus possible to the movement for funeral reform. This cause is bound to make but slow progress all the while the lumbering horse hearses and carriages continue to be used. There is no need for the traction company to enter into rivalry with the funeral furnishing firms. The place of the companies would be to supply the vehicles, which would be hired by the funeral directors.

At present, funeral vehicles, both motor and horse, are perhaps



Interior of a Brill Funeral Omnibus.



Exterior of a Brill Funeral Omnibus.

the most unremunerative carriages in existence, for except when journeying to and from the cemetery they are useless. No doubt it would be possible to reverse this unsatisfactory state of affairs by providing a funeral omnibus, which would be capable of conveying the whole party of mourners as well as the departed person. Besides having the advantage that its speed would enable it to do duty at more than one interment in a day, the vehicle could be so planned and furnished as to enable it to be used for other engagements in the evening.

Such is the intention of the J. G. Brill Company, of Philadelphia, with the funeral omnibuses that they have constructed. In the first place the exterior is not embellished with the black-blue hue that prevails in this country as one of the "trappings of woe." The exterior of the omnibus illustrated on this page is finished in dark green, while the black silk curtains are removable. In their description of the vehicle the Philadelphia manufacturers of tramcars and omnibuses state that "its arrangements and fittings are such that it can be utilised with equal facility for more joyous occasions."

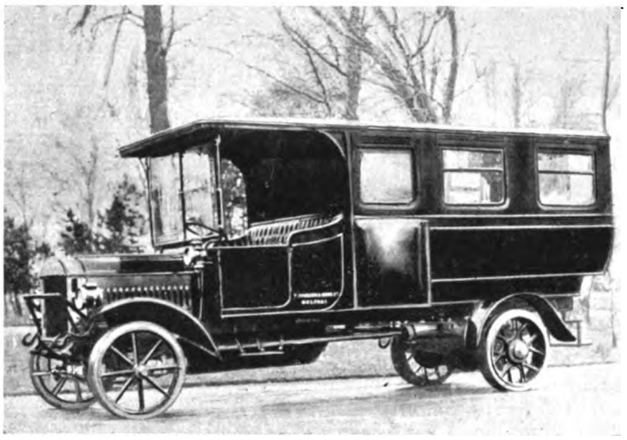
There are three compartments—the front one for the driver, the centre one for the casket, and the rear one for the mourners. Access to each of them can be had through doors on either side. The casket chamber is separated from the driver's compartment by a panelled partition of mahogany, and from the passenger part of the car body by a low panelled partition and two turned mahogany columns running to the ceiling. There is also a black silk curtain the full width of the interior between the casket and passenger departments. In each of the upper rear corners is an electric fan; the battery for driving the fans and supplying light to the five ceiling domes being carried under the left-hand portion of the driver's seat. Under the seat also is the petrol tank. In the left-hand rear corner of the passenger's compartment is a water cooler, while a mirror is panelled into the opposite corner.

Special attention has been devoted to the design of the seating accommodation for the mourners. There are three settees and five arm chairs, all of mahogany and upholstered in real leather. A transverse seat, also upholstered in leather, runs across the rear of the car. All interior woodwork of the three compartments, including panelling, mouldings, and ceiling, is of mahogany, and all hardware and metal fittings are silver-plated.

DENNIS COMBINATION HEARSE.

When its merits become known there should be a considerable demand for the combination motor hearse introduced by Dennis Brothers (1913), Limited, of Guildford, an illustration of which is given below.

This double-purpose vehicle has been supplied to a Belfast firm.



Dennis Hearse and Omnibus.

The body is removable, and a plain lorry body can be substituted when required. For this operation lifting hooks are fitted. The compartment for carrying the coffin is situated behind the driver's seat, and there is accommodation for two coffins. The bulk of the body space remains available for use as an omnibus or for carrying mourners.

ARROL-JOHNSTON EMPLOYEES' WAR FUND.—Last year the employees of the Arrol-Johnston motor factory at Dumfries raised £833 among themselves, and at the instance of Mr. T. C. Pullinger, the managing director, the company supplemented that sum by a donation equal to 30 per cent. of the total. The fund has given assistance to thirteen institutions as well as to forty former soldier employees of the firm and their dependents. The company, who employ 600 men, are engaged on Government orders.

COTTON INDUSTRY MOTOR TRANSPORT COMPANY, LIMITED.—The registered particulars of this company, which has been formed owing to the difficulties experienced in railway transport between Liverpool, Manchester, etc., are as follows:—Registered office, 4, Norfolk Street, Manchester. Private company, with a capital of £41,000 in 40,000 ordinary shares of £1 each, and 20,000 deferred shares of 1s. each. To carry on the business of running motor-driven vehicles, etc. Directors:—W. H. Midwood, H. L. Roxburgh, T. W. Cooke, B. S. Stott, J. Hoyle, A. L. Ormrod, H. E. Holmes, and J. R. Dixon.

Digitized by Google

MOTOR TRAFFIC.

MOTOR VEHICLES FOR MUNICIPALITIES.

LEEDS GAS COMMITTEE have resolved to purchase two motor wagons.

CALCUTTA COUNCIL have purchased a car for the use of the accounts department.

ECCLES COUNCIL have invited tenders for the supply of a motor ambulance and a motor disinfecting van.

HARROGATE COUNCIL have purchased a 40-H.P. Daimler lorry, at £892, for the use of the highways department.

BIRKENHEAD SANITARY COMMITTEE are sending a deputation to various towns in order to investigate the various methods of motor haulage.

BIRMINGHAM COUNCIL have agreed to the Baths Committee's recommendation for the purchase of a motor car for the use of the baths superintendent at £180.

LAMBETH COUNCIL have received a report stating that the use of two motor-driven street sweeping machines has displaced 30 horse-drawn sweepers, and effected a saving of £827 in six months.

BRADFORD CLEANSING COMMITTEE have sanctioned the purchase of 25 handcarts for the use of street sweepers and two motor tractors, at a cost of £550, for the conveyance of loaded cart bodies to tips.

DERBYSHIRE COUNTY COUNCIL are purchasing two motor wagons, at £1,470, owing to the scarcity of team labour for road maintenance. The Road Board are advancing the money on loan, free of interest.

HOLBORN COUNCIL have accepted an offer of Hill's Patent Motor Vacuum Road Cleanser, Limited, to hire one of their road sweepers to the Council for the sum of £20 a week for three months, inclusive of attendance and all running charges.

HULL TRAMWAYS COMMITTEE have directed the electrical engineer to obtain prices for the supply of two motor tower wagons. Mr. J. Wilkinson, the electrical engineer, expressed the opinion that battery vehicles would be both efficient and economical.

BRIGHTON GUARDIANS have received the sanction of the Local Government Board to the purchase of three Ford motor vans, at £487. At present the authority hire motor vans, and it is estimated that the saving anticipated from the new scheme will in one year equal the cost of the vehicles.

ILFORD COUNCIL have received a report from their electrical engineer to the effect that the average cost per ton of coal delivered by the Edison battery wagon is about 9d. per ton, inclusive of wages, energy, maintenance, capital charges, insurance, etc. The cost for horse cartage was 11d. and 1s. per ton.

SOUTHEND TRAMWAYS COMMITTEE have received an offer from Edison Accumulators, Limited, offering to supply additional omnibus chassis at £890 each, and to replace existing chassis with their new model, less an agreed sum in respect of depreciation. The committee have deferred consideration of the offer until after the war.

PLYMOUTH CORPORATION GAS COMMITTEE have agreed to purchase an eighth Mann steam wagon. The Works Committee have instructed the borough engineer to present a report on the use of mechanical and horse traction for refuse collection, general cartage, watering, and cleansing. Two Mann wagons are at present in use.

GREAT YARMOUTH COUNCIL have had a report presented by Mr. J. W. Cockrill, the borough surveyor, stating that during the year ended March 31 last the steam wagons had worked on 714 days at a cost of £463, including wages, repairs, water, oil, and fuel. That was equal to 13s. a day worked. Adding 5s. a day, which would be sufficient to purchase a new steam wagon in eight years, the total cost would be 18s. per day each. For the year ended March 31, 1915, the expenditure on horse hire and contract was £3,153, but in the year just ended it was only £618.

INSTITUTION OF AUTOMOBILE ENGINEERS.—On April 12, at the Surveyors' Institution, 12, Great George Street, S.W., Major B. W. Shilson read a paper entitled "From Engine to Axle." This paper was intended as a connecting link between the papers recently read by Messrs. G. W. Watson and W. D. Williamson, and the three papers together cover the whole field of the engine and transmission of the petrol-driven heavy motor vehicle.

PETROL CONTROL COMMITTEE.—The President of the Board of Trade has appointed Mr. Oliver Bury (chairman), Mr. A. E. Bowen, Sir John Hewett, and Mr. P. G. L. Webb to be a committee to control the supply and distribution of petrol and to consider what measures are necessary in the national interest. Mr. H. W. Cole, of the Board of Trade, will act as secretary to the Committee, whose offices will be at 29, Abingdon Street, Westminster, S.W. The committee are not prepared to consider individual applications for supplies of petrol.

MOTOR TRAFFIC NOTES.

BRADFORD MUNICIPAL GARAGE.—A committee of Bradford Corporation have recommended that a garage and petrol store be erected at Dumb Mill, at an estimated cost of £1,268.

BIRMINGHAM AND MIDLAND OMNIBUS COMPANY.—A license for one year has been granted to this company by Malvern Urban Council to run a service in their district, with extensions to Worcester, Droitwich, and Birmingham.

AMBULANCE WITH HEATING APPARATUS.—The first ambulance car in England to be fitted with heating apparatus was presented to the Mayor of Wandsworth on April 8 by the school children of Wandsworth for the use of the locally raised battalion.

SCARCITY OF INDUSTRIAL VEHICLES.—In their half-yearly report the directors of the South Suburban Gas Company state that the delivery of coke to consumers in London has been seriously interfered with by the scarcity of conveyances for road transport. The company make considerable use of motor vehicles.

OMNIBUS SERVICES IN NOTTINGHAMSHIRE.—Some time ago a company inaugurated a motor omnibus service from Nottingham to Ilkeston. Plans have been prepared for additional services from the city to several county centres, such as Derby and Mansfield. The services will also serve mining districts. As deliveries of the vehicles are received, licenses will be applied for.

COMBINED LORRY AND CHARS-A-BANC.—During the Easter holidays a motor lorry, convertible into a chars-a-banc, was run between Baildon Bridge terminus of Bradford tramways and the moor that has been acquired by the Corporation at Baildon. Success seems to have attended the enterprise, the fare for the uphill journey being 4d. and a penny less the other way. The extension of the tramways has been deferred owing to the war.

AN IMPROVED SOLID TIRE.—The Goodrich Company, who a short time ago brought out their "P.B." (protected base) band tires in inch sizes, have just put upon the market tires in millimetre sizes. The makers consider that the advantages to be obtained from the new type are so important that they will have a marked effect upon the future type of all band tires. Some of the characteristics of the new type are easy application, greater strength, better union between rubber and steel, and better protection to the hard rubber base.

HOURS OF WOMEN OMNIBUS CONDUCTORS.—Mr. Cathcart Wason asked the Home Secretary in the House of Commons how many hours a day girls and young men were employed as conductors on London motor omnibuses. Mr. H. Samuel replied :—I am informed that the hours for women and men are practically identical, and vary from nine to twelve hours. The earliest shifts begin at 6 a.m. and the latest finish at midnight. The times off daily vary from about forty minutes to four hours. I understand that the majority of the women do not work more than four or five days a week.

IMPORTANCE OF ROAD MOTORS TO BATH TRAMWAYS COMPANY.—Sir J. Sievwright, who presided at the annual meeting of the company on April 27, said the decrease of £5,558 in the receipts was largely attributable to the reduction of the company's motors when, in the latter part of 1914, a large number of them were transferred to the Government for military service for which the company, had been paid. Economies in operation and the expenses of the company more than met the diminution in receipts, and owing to the reduction in this direction the actual revenue for 1915 was greater than in the previous year. Operating as they had been without the greater part of their torpedo car fleet, they had been successful and compared favourably with the previous corresponding period. There was a promising future before the company, and if they pursued their present policy they would have an improved fleet, and the foundry, which was taken over two years ago, would be extended.

OXFORD OMNIBUS EMPLOYEES AND MILITARY EXEMPTION.—Application was made to the Oxford Military Tribunal by the local Electric Tramways Company, who operate motor omnibuses only, for the absolute exemption of their chief engineer, electrician, fitter's mate, unit adjuster, and thirteen motor drivers. Mr. A. A. Tyler, the manager, stated that the company were under a statutory obligation to run omnibus services, and it was necessary to retain all drivers now left. The company had 92 men and 36 girls. Of the 113 men employed at the outbreak of war and those employed since, 119 had gone into the army. In reply to the military representative, Mr. Tyler said there were 38 drivers. They worked three men to each two onmibuses. There were about thirty omnibuses, but they could not all be utilised owing to the shortage of drivers. Conditional exemption as being in a certified occupation was granted in respect of the chief engineer, the electrician, the fitter's mate, and the unit adjuster. The other thirteen cases were adjourned for two months.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 25. | LONDON, SATURDAY, MAY 13, 1916. | [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

LIVERPOOL OVERHEAD RAILWAY.

CONTRACTS FOR STORES.

The Directors are prepared to receive Tenders for the supply of the Company's ordinary requirements of the following Articles during the twelve months ending June 30, 1917:—

1 Bolts and Nuts.
2 Electrical Fittings.
3 Files.
4 Fluid (Boiler).
5 General Stores.
6 Indiarubber Material.
7 Iron and Steel.
8 Ironmongery.
9 Oil and Grease.
10 Packing (Engine).
11 Screws.
12 Soap (Liquid, etc.).
13 Tapes (Insulating).
14 Timber.
15 Waste and Sponge Cloths.

Further particulars and forms of Tender may be obtained on application to 31, James Street, Liverpool, where parties are requested to call and examine the samples before tendering. The sample room will be open for this purpose on May 17, 18 and 19, between 10 a.m. and 1 p.m. and 2 p.m. and 4 p.m. The Company's patterns cannot be sent away for inspection, all being exhibited at the before-mentioned address. Tenders properly endorsed and addressed to the General Manager must be sealed and posted so as to be received not later than 10 a.m. on Wednesday, May 31, 1916. Any sent otherwise or not in special envelope (provided for each contract) will not be considered. The Directors do not bind themselves to accept the lowest or any Tender.

E. J. NEACHELL.
General Manager.

31, James Street, Liverpool.

COUNTY BOROUGH OF BURTON-UPON-TRENT. TRAMWAYS DEPARTMENT.

UNIFORMS.

The Corporation of Burton-upon-Trent invite Tenders for the supply of Tramway Uniforms.

Copies of the specification and conditions of Tender may be obtained from the undersigned, to whom sealed Tenders, endorsed on the outside "Uniforms," must be delivered by May 29, 1916.

No Tender will be accepted from any party who pays his employees (whether artisans or labourers) less than the standard rate of wages paid in the Borough of Burton-on-Trent, or who does not conform to the hours and conditions of labour generally recognised in each branch of the industry affected, and clauses to ensure payment of the standard rate of wages, etc., for work done under the proposed contract will be inserted in the contract.

Only Tenders which are made out on the forms to be obtained from the undersigned will be considered.

The Corporation do not bind themselves to accept the lowest or any Tender, and parties tendering must do so at their own expense.

A. B. SLATER,
Tramways Manager.

Tramways Offices, Burton-on-Trent.
May 10, 1916.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive Tenders for the supply of the following Stores, namely:—Railway Tickets, etc.

Specifications and forms of Tender may be obtained at this office on payment of the fee for the Specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Railway Tickets, etc.," or as the case may be, not later than 11 o'clock a.m., on Thursday, May 18, 1916.

The Directors do not bind themselves to accept the lowest or any Tender.

R. H. WALPOLE,
Secretary.

Company's Offices, 48, Copthall Avenue, E.C.
London, May 10, 1916.

CITY AND COUNTY BOROUGH OF BELFAST.

MECHANICAL STOKERS.

The Tramways and Electricity Committee of the Belfast Corporation are prepared to receive Tenders for the supply of Chain Grate Mechanical Stokers.

Specification, with form of contract, may be obtained from Mr. T. W. Bloxam, City Electrical Engineer, East Bridge Street, Belfast, on deposit of one guinea for each specification. This deposit will be refunded, provided a bona-fide Tender has been sent in and not withdrawn.

Extra copies may be obtained at 10s. each, which sum will not be returnable.

Sealed Tenders, endorsed "Tender for Mechanical Stokers," to be lodged in the Town Clerk's Office, City Hall, Belfast, not later than 10 a.m., on Wednesday, May 24, 1916.

An official receipt must be obtained for every Tender delivered by hand. Tenders sent by post must be registered.

The Council do not bind themselves to accept the lowest or any Tender.

BY ORDER.

BOROUGH OF SWINDON.

TO COLLIERY PROPRIETORS AND OTHERS.

TENDERS FOR STEAM COAL.

The Corporation of Swindon invite Tenders for the supply and delivery of Steam Coal, for their Electricity Works and Waterworks respectively.

Forms of Tender and all particulars can be obtained on written application to the undersigned.

Sealed Tenders to reach the undersigned on or before 12 o'clock at noon on Tuesday, the 30th inst.

The Corporation do not bind themselves to accept the lowest or any Tender.

ROBT. HILTON,
Town Clerk.

Town Hall, Swindon.
May 4, 1916.

POSITIONS VACANT.

BOROUGH OF BEDFORD.

ENGINEER-IN-CHARGE.

Engineer-in-charge required for H. T. Alternating Station. Turbine experience essential. Wages £2 to £2 5s., war bonus 1s. 6d. Extra shifts paid. Applicants must be ineligible for military service.

Applications, stating age, experience, etc., accompanied by copies of testimonials and endorsed "Engineer-in-charge," to be sent to the undersigned not later than May 25.

R. W. L. PHILLIPS, A.M.I.E.E.

Electricity Works,
Caudwell Road, Bedford.

Digitized by Google

OVERHEAD LINESMAN.

Wanted, Overhead Linesman for about seven miles of tramway overhead system and three miles of railless overhead system.—Apply, with full particulars, wages required, to the Mexboro' and Swinton Tramway Company, Dale Road, Rawmarsh.

FOREMAN PLATELAYER.

Wanted, Working Foreman Platelayer, permanent job. Apply, giving particulars of experience and wages required. Engineer and Manager, Rhondda Tramways Company, Ltd., Porth, Glam.

SECOND-HAND CARS.

Advertiser requires information of secondhand double deck or single deck cars (the former preferred) for sale. Reply, giving particulars of prices of cars, with spares available, including prices to contractor.—Box No. 38, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 8488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MAY 13, 1916.

A SOLUTION OF THE GOODS TRANSPORT PROBLEM.

Elsewhere in this issue we publish some particulars of an experiment that the Bradford Tramways Department have inaugurated with a vehicle of original design for the transport of the raw material of the city's staple industry. As a result of the war there has been great difficulty in securing conveyances for the delivery of wool from railway depots to the cloth factories. The same trouble has been experienced at Manchester and at the Liverpool docks in reference to the transport of cotton, with the result that a company has been formed to operate a fleet of petrol vehicles. This method of relieving the congestion existing on the railway has much to commend it, but with the present scarcity of fuel, and the high price charged for it, the financial result will probably prove disappointing during the continuance of the war. There is no risk of such an outcome of the Bradford experiment, for although a dual method of transit has been adopted, the motive power is one and the same, namely electricity. As it is derived from the same source as the supply for the tramways, its low cost of production at once gives it a great advantage over any other means of transport. Mr. C. J. Spencer's ingenuity has produced a combined railless trolley and electric battery vehicle, built up from the chassis of a road trolley car that had been in use on the Bradford railless installation since 1911. Two 20-horse-power motors are utilised for propulsion, and these are driven either direct from the trolley wire or from the accumulators, the batteries being charged during the time the energy is being taken from the wire. As the greater part of the mileage will be run on the trolley system the wear of the accumulators will be reduced to the lowest possible limit. It is the improvements effected in the latter, during recent years, that have made their use possible from the point of view that they will stand heavy rates of discharge for short periods and can be charged very rapidly. A load of several tons can be carried on the lorry body at the speed of a tramcar while working as a trolley vehicle, and as the arm can readily be removed from the overhead wire no obstruction to tramcar traffic is to be apprehended. The least satisfactory feature of the vehicle is its appearance at the front end, where the trolley arm is erected. There is a dashboard similar to that of a tramcar and a compartment for the driver have been erected, the structure being enclosed on three sides. Judging by the experiments already made in the transport of sand and wool, both on and off the tramway tracks, the success of the innovation seems to be assured. Its progress will be closely followed by tramway managers elsewhere, for a successful outcome will enable them to adopt similar means of transport for goods and parcels traffic. Hitherto the difficulty of linking up railway depots and manufacturers' works with the tramway tracks has prevented the use of rail traction for goods traffic in all but a few instances. The problem in relation to Liverpool and the network of tramways in Lancashire was made the subject of comprehensive reports to the Liverpool Corporation both by the late Mr. Bellamy in 1904, and by Mr. Mallins three years ago. The outside tramway companies and authorities were ready to co-operate in the scheme, but railway interests appear to have been the chief hindrance. If the project had been carried out it would have proved of great utility to the cotton manufacturers in the area between the Mersey and Manchester, especially as the war has added to the congestion on the railways.

CONDITIONAL EXEMPTION OF EMPLOYEES.

Mr. E. Hatton, general manager, Newcastle Corporation Tramways, appeared before the Newcastle Military Tribunal on May 9, with regard to tramway employees. He said they had a number of married conductors who were being trained as motormen. Out of 823 employees, 133 were eligible for service. There were thirty single motormen whom he must keep, and there were one hundred married men who had received conditional exemption. The conductors were being trained as motormen, and in all there were 107 of such men for whom he wanted exemption. Lads were driving and earning 40s. per week, with overtime. In reply to the chairman, Mr. Hatton said that if the Government would release soldiers who were no longer needed, he would be glad to release some Corporation employees. But the Government would not listen to it. There was an increasing difficulty in getting women. The Chairman suggested that an application be made to the Ministry of Munitions to secure released men so that further tramway employees might be released. It was agreed that the motormen be given conditional exemption and a similar course was adopted with respect to thirty-two single conductors who were being trained as motormen and seventy-five married conductors. It was also decided that all up to and including group seven (men under twenty-five years) should be refused exemption. With regard to the inspectors it was decided that all up to and including group forty be refused exemption, and all labourers at the power station were similarly treated.

The Middlesborough, Stockton and Thornaby Tramways Co. made application to Stockton Military Tribunal for the exemption of sixteen drivers. The company had released 115 men and made provision for their dependants. They were now down to the limit of their staff, and for every three men taken away it would mean the withdrawing of one car from the service. In answer to the chairman the manager said he had not introduced girls because he had been able to obtain plenty of youths under military age as conductors. It would not ease the situation to discharge these lads and take on their sisters. The tribunal thought the company should be able to make arrangements to spare a few more men, and seven of the applications were dismissed and nine granted conditional exemption.

MOTOR OMNIBUS RESTRICTION.

The House of Lords on May 9 agreed to the amendments which the Commons made in the new clause inserted in the Local Government (Emergency Provisions) Bill in Committee in the House of Lords. The object of the clause was to prevent omnibuses and chars-a-bancs plying, without the consent of the highway authority, on any route which had not been regularly used within one year prior to March last. The Commons made the period two years.

Mr. R. S. Tilling, speaking from the chair at the annual meeting of Thomas Tilling, Ltd., on May 10, said :—" I should like to correct some statements I have seen in the public Press to the effect that the motor omnibus pays nothing in taxes. As a matter of fact, with the 3*d.* per gallon duty on petrol, the licences, etc., the contribution amounts to more than ½*d.* per mile. This sum, if applied to the upkeep of the roads, would more than cover the most extravagant estimate of the extra wear caused by a motor omnibus. The contention of some of the road authorities that the traffic should be made to fit the road and not the road to fit the traffic is a most retrograde idea, and if this had been adopted in the past it would mean that we should be still using sedan chairs and saddle horses. Again, to put an extra tax on the vehicle which carries passengers and exempt the one that carries goods is most illogical."

Digitized by Google

THE BRADFORD GOODS WAGON.

The new motor wagon, designed by Mr. C. J. Spencer, general manager of the Bradford City Tramways, for the conveyance of goods in connection with the ordinary passenger tramway service, was given a trial on May 8, and was found to work with smoothness and efficiency in every respect. The new vehicle is simple in design, but in every way suitable to the purposes to which it is to be put. Taking the chassis of an old railless trolley car, Mr. Spencer has built upon it a long, broad lorry body similar in shape and dimensions to those on petrol motor lorries. The great difference is that instead of using petrol, which is so dear in these days, the new transport wagon is run by means of the existing electric tramway overhead equipment. It may thus have the advantage of greatly reducing the demand for petrol, minimising running costs, and at the same time contributing greatly to the public convenience at a period when there is so serious a deficiency in transport services. Councillor Enoch Priestley, chairman of Bradford Tramways Committee, Mr. C. J. Spencer, general manager, and Mr. W. Fleming, parcels superintendent, witnessed the test of the vehicle on Monday last. At the Thornbury tramway depot it was seen wheeling in and out with the facility practically of an ordinary motor car. A load of two tons was put on the wagon, and with this it made a satisfactory journey to Wibsey. The great advantage of the new wagon is that it can be driven either from the trolley wires of the tramway system or entirely apart from them. The latter feature is due to the great advance that has been made in the adaptability of electric accumulators, enabling them to stand heavy rates of discharge for short periods and, on the other hand, to be charged very rapidly. The wagon is surmounted by a trolley pole to enable attachment to be made to the overhead wire, and earth attachment can be effected at will. Thus the wagon can be coupled up instantly with the tramway equipment and run at similar speeds, on the level or on rising gradients, as the passenger cars. When necessary, detachment can also be made instantaneously, and the vehicle can be run short distances, up to a few miles, without any aid from the trolley wire. Under the body of the wagon are a considerable number of electric accumulators. By an ingenious arrangement these are charged with current while the wagon is running on the trolley system. The wagon is driven by two 20 h.p. electric motors, which are used both for the battery and trolley systems.

ENFORCING TRAMWAY BY-LAWS.

With a view to discourage the practice of crowding on to full cars, the Newcastle Tramways Department are instituting prosecutions. In a case heard on April 28, an engineer was fined 30s. for having boarded a tramcar in Westgate Road, and remained on the car when it was full with passengers, and also for using obscene language. Defendant said he had only done what hundreds of others had done.

Several fines of 20s. were imposed by the Sheffield justices on persons who had attempted to avoid payment of fares. A woman was fined 5s. for leaving a car in motion. She went on to the front platform, lifted the chain, and got off, but fell in doing so. A man who rode past a halfpenny fare stage and used offensive and threatening language to a woman conductor when she asked for the additional fare, was fined 40s. for the use of the objectionable expression. Another person was fined 10s. for committing a nuisance on the top deck; while for mounting a car whilst he was intoxicated a man was ordered to pay £1.

At West Hartlepool a youth was prosecuted for having refused to pay his fare, he not being "an artisan, mechanic, or daily labourer." Between 12 p.m. and 1 o'clock on March 13 defendant got on to a car at Throston Bridge, and was given an ordinary penny ticket, which would entitle him to travel as far as the gasworks. After he had passed that stage his attention was called to the fact, but he refused to pay any more fare and claimed that he was a workman. The summons was dismissed, with solicitor's costs to the defendant.

THE EMPLOYMENT OF WOMEN.

By the end of May 500 women will be engaged in tramcar cleaning at Glasgow, thus freeing 300 additional men for military and munition service. There are 1,300 women conductors and drivers.

Brighton Omnibus and Railless Trolley Powers.—On account of the war Brighton Corporation have decided to apply to the Board of Trade for an extension of the time allowed in their Act for the exercise of powers relating to the proposed railless trolley installation, and for the granting of additional powers in regard to motor omnibuses. The railless trolley powers expire in 1917. The motor omnibus clause permits the operation of such vehicles on the authorised trolley routes pending the construction of the railless undertaking. Under an earlier Act of 1903 the Council had also obtained powers to run omnibuses on specified routes, but it has never been exercised. It has now been decided to apply for the amendment of the two Acts in order to acquire a general power of running omnibuses without limitation, in accordance with the present practice in the granting of motor omnibus powers. Authority is also to be sought to enable the Corporation to lease the right to run omnibuses with the consent of the Board of Trade. A similar provision is contained in the Hove Corporation Railless Trolley Act.

MISCELLANEOUS NEWS AND NOTES.

Port Adelaide Council have decided to borrow £12,000 for the construction of an electric tramway.

Restriction of Free Riding.—Dundee Tramways Committee have decided that free passes shall be restricted to totally blind persons, nurses on war work, ordinary nurses, and probation officers.

Electric Vehicle Committee.—The Society of Motor Manufacturers and Traders, Ltd., have appointed Mr. T. C. Pullinger, of Arrol-Johnston, Ltd., to represent this Society upon the Electric Vehicle Committee.

Conveyance of School Children. Sheffield Tramways Committee have agreed to convey about 100 children to and from the Whiteley Wood open-air school during the season beginning April 3, at a cost to the Education Committee of £275.

Manchester-Reddish Through Cars.—In order to meet the requirements of factory workers in the Reddish district, arrangements have been made with the Stockport Corporation Tramways for the temporary through running by Manchester Corporation cars.

Trailer Cars at Birmingham.—The first trailer cars will be put in service on the Birmingham Corporation Tramways next week. The cars will be used on the Handsworth route and if found suitable they will no doubt be generally introduced throughout the system as circumstances require.

Return of Soldier Employees.—It has been decided that in cases where tramway employees at Sheffield return to work from war service, the general manager, in dealing with wage rates and merit pay to them, shall count as Corporation service the period they have served with the forces.

Rhondda Tramwaymen and Military Service.—At a sitting of the Rhondda Military Tribunal on May 8, the representative of the Tramways Company stated that if their staff were further weakened, facilities afforded workmen would have to be restricted, and Mabon promised that he would see the Minister of Munitions on the subject.

Resumption of Dublin Tramways Service.—Towards the end of last week the services of the Dublin United Tramways Company had become practically normal. The cars, however, are stopped for a second or two while passing the military cordons to enable a cursory inspection of the passengers to be made.

Launceston Holiday Cars.—In 1913 the Launceston Municipal Tramways introduced three holiday cars, which were also to be used at rush periods. Their average yearly mileage has been but 11,229 miles, as against 64,553 miles for each ordinary car. In view of this, the council have decided to effect such alterations and improvements in the cars as will fit them for general service.

Special Constables' Fares.—On the plea that the expense would be only a few pounds, the Watch Committee asked that a special constable at Sunderland should be allowed to travel free on the tramcars when going on or off duty. By 27 votes to 23 the Corporation decided, on the motion of Councillor G. New, chairman of the Tramways Committee, that the cost should be borne by the Watch Committee.

Oldham and Through Running.—In response to an appeal made at the May meeting of the Town Council, the Tramways Committee undertook to reconsider the question of through running to Manchester and to Rochdale. On the latter route it was stated that the double-deck cars could not pass underneath the railway bridge between the Summit and Rochdale Town Hall, and a member advocated that the height of the vehicles should be reduced.

Saving of Time by Railway Electrification.—In connection with the opening of the electric train service between Manchester and Bury a statement has been issued showing that by steam train the journey from Manchester to Bury, with stops, takes 32 minutes, as compared with 24 minutes on the electric service. From Bury to Manchester the time by steam train is 29 minutes, as against 22 minutes by electric train.

Accident at Plymouth.—A steam lorry, laden with coke, while proceeding up Devonport Hill, ran backwards and struck a tramcar, which was also going up the ascent. The collision rendered the brakes of the car useless. The car ran back and was eventually stopped in the siding at Stonehouse. One passenger died and several received injuries through jumping from the car. A fracture of the driving chain was the cause of the accident to the lorry.

Wallasey Motormen and Exemption.—In consequence of the local tribunal having adjourned all cases of appeals by married men until the single men brought out of reserved occupations have been dealt with, Colonel R. R. Green, the tramways manager, has deferred for a month his application for the further exemption of 28 married motormen. The tribunal refused exemption to a handy man who had taken on the work of a motor controller who had been allowed to enlist.

Lucan Electric Railway and the Insurrection.—Mr. D. M. M'Dowall Grosart, secretary and manager, Dublin and Lucan Electric Railway, has related that when the rebels took possession of the South Dublin Workhouse on Easter Tuesday, sniping was continuous. The roar of machine guns and rifles became continuous, and the bullets passed over the company's buildings in hundreds. Soldiers were accommodated on the premises of the company, who supplied them with food. The railway service was maintained throughout.

Motor Tires Imports Not Prohibited.—In a preliminary official list published on May 6 motor tires and tubes were given as being among the articles the import of which was to be prohibited in order to lessen the demand upon shipping facilities. In the House of Commons on May 9, the President of the Board of Trade stated that the Board had been unable to include motor tires in the list. There were certain arrangements made with the rubber importers in the United States which had led to the decision that this prohibition should be abandoned.

Digitized by Google

Indian Railway Electrification Scheme.—Mr. S. G. Forbes, chief electrical engineer, Mysore, has put forward two schemes for supplementing the existing generating works at Canvery Falls. Besides affording a supply of electricity for Madras City, the scheme would enable the railway from Bangalore to Mysore to be electrified, the distance being eighty-seven miles.

American Motors for India.—The Washington correspondent of the "Mysore Economic Journal" reports that the motor-vehicle manufacturers in several States of North America have combined to send six smart travellers to push their goods of every description in the principal cities of India.

Melbourne Railway Electrification.—Provided that sufficient apparatus is received from the London works of Siemens Bros., Ltd., the Victorian Railway Minister states that it would be practicable to begin running electric trains on the Essendon and Sandringham section about the end of this year. The present indications are that the determining factor will be the supply of switchgear. Mr. C. H. Merz, the consulting engineer, and the Agent-General in London, have asked the Minister of Munitions to consent to the contractors proceeding with their work, but had not obtained a definite promise.

Salaries at Liverpool.—The Tramways Committee on May 3 recommended the Council that the salaries of thirteen of their officials should be increased to the maximum of the scale. Alderman Salvidge moved that the proposal be referred to the Finance Committee for consideration and report, and this was accepted by Councillor E. Russell Taylor, chairman of the Tramways Committee. Alderman F. Smith observed that the Tramways Committee had taken the line of grading their men, with whom they made a bargain that if their conduct was approved at the end of three years their salaries would be subject to revision.

Efficacy of Lifeguards.—At an inquest at Nottingham on a four-year-old child, who was killed by falling between the track and the lifeguard of a tramcar, Mr. W. Boot, the works superintendent, stated that the deceased did not come in contact with the gate. Last year ten lives were saved by the operation of the lifeguard on the cars. In a similar inquiry at Sunderland, a child was stated to have fallen under the step, escaping the gate. Mr. A. R. Dayson, the general manager, said that the steps being fixed, it was impossible to have a guard there. The system of guard they used was the very best, but he would carefully consider if it were possible to improve upon it.

Sequel to the Gateshead Accident.—One of the measures suggested by the Board of Trade for lessening the risk of a repetition of the recent running back accident at Gateshead was that the single line on a section of the Bensham route should be doubled. Upon the Tramways Company applying for permission to carry out the work, the Improvement Committee recommended that the request be granted, conditional upon the company undertaking the cost of paving the strips of macadam on either side of the road, at an estimated cost of £675. The company replied that they did not consider it just that they should be called upon to do more than the area for which they were liable. The Corporation have supported the committee's action.

The Croydon Strike.—Not satisfied with the dismissal of three batches of summonses at separate police courts against the management of the Corporation Tramways and the South Metropolitan Tramways, for employing men and women without licenses at the outset of the strikes, the police brought further charges against the South Metropolitan Company. The Penge magistrates again dismissed the cases. Improvements continue to be made in the Croydon running. Many of the strikers will soon be feeling the effect of the compulsory Military Service Act. Nearly one hundred men were liable for service when the strike began. One hundred and twenty-seven late employees have been summoned for not returning their uniforms, and an adjournment was granted.

Edinburgh Tramways.—The Tramways Company have informed the Tramways Committee of the City Council that they cannot accede to the request of the Trades Council to extend the workmen's cheap morning period one and a half hours beyond seven o clock in the morning, and also a period introduced between 12.30 and 2.30 p.m. The Company also stated that they were giving their best attention to remedying traffic interruptions. It was intimated that while over 5,000 pulleys had been repaired a large number of others had got into disrepair. In connection with the cable cars, a report by the hackney carriage inspector stated that while many of the cars were in good order a number were in bad condition. The Town Clerk was instructed to write the Company on the subject.

Clocks to be Advanced One Hour.—By 168 votes to two, the House of Commons on May 8 passed the following resolution, submitted by Sir H. Norman:—"That in view especially of the economy in fuel and its transport that would be effected by shortening the hours of artificial lighting, this House would welcome a measure for the advancement of clock time by one hour during the summer months of this year." The mover mentioned that it was estimated that the London County Council Tramways would save £10,000, the railways would save £92,000 and that for the whole country the saving would be £2,500,000. On May 9 the Home Secretary presented the Bill to provide for the local time in Great Britain and Ireland being in advance of Greenwich and Dublin mean time during the summer months. The measure has since been passed, and the public clocks will be advanced one hour on the night of May 20-21. On October 1 the clocks will be put back one hour, thus reverting to the normal condition. The Act provides that his Majesty may in any subsequent year, by Order in Council made during the continuance of the present war, declare this Act to be in force during that year, and in such case the prescribed period in that year shall be such period as may be fixed by the Order in Council. The short title of the Act will be the Summer Time Act, 1916.

PERSONAL.

Mr. A. J. Abraham, general manager of the Aberdare electricity and tramways department, has been granted an increase of salary of £50 per annum.

Mr. C. F. Butler, late acting manager and engineer, Gravesend and Northfleet Tramways Company, has received a War Office appointment as station engineer to a group of generating stations near Salisbury.

Mr. W. M. Murphy, chairman of Dublin United Tramways Company, presided at a meeting of property owners and traders held at the Mansion House in that city, at which the Government were asked to lose no time in making good the losses that they sustained during the rebellion.

Mr. A. W. Lyon, senior partner of the firm of Price, Waterhouse and Co., has been appointed by the Board of Trade to succeed to the position of consulting accountant to the Government, in connection with the control of the railways, rendered vacant by the death of Mr. J. Gurney Fowler.

Potteries Electric Traction Staff.—In the course of his remarks at the annual meeting of the Potteries Electric Traction Company, the Chairman said he must refer to the excellent work which had been done under very trying circumstances by the general manager, Mr. W. Thom; the assistant manager, Mr. F. Hatch; Mr. Edwards; and the other officers. Mr. Thom had had thrown on his shoulders the work of arranging for the release of as many men as possible, and the work he had done had been fully recognised by the local recruiting authorities. On behalf of the shareholders he expressed their thanks to the officers for their good work.

Major F. J. Chapple, power and rolling stock superintendent, Potteries Electric Traction Company, who is serving at the front with the North Midland Heavy Battery, was referred to by Mr. R. J. Howley, the chairman of the company, at the annual meeting. The shareholders, he said, would be glad to hear that Major Chapple, as he now is, had been mentioned in despatches and had been made a Companion of the Distinguished Service Order for the good work which he had done since February last. He was sure that the thoughts of the shareholders went out to Major Chapple and to the other members of the staff who were serving their country, and that they wished them all good luck and a safe return.

Mr. I. Bulfin, general manager, Bournemouth Corporation Tramways, and his staff were complimented at the May meeting of the Council upon the results of the last year's working of the tramways. Upon the recommendation of the Tramways Committee, Councillor Bell, their chairman, moved "that the Council express to the general manager their appreciation of the position of affairs as shown by the report, which the Committee consider, having regard to the exceptional circumstances of the year under review, are a matter for congratulation of both the manager and the entire staff." On the motion of the Mayor it was decided that the minute should be embodied in a letter to Mr. Bulfin. His Worship added that a good manager, a good chairman, and a loyal committee all deserved their meed of praise. In the report Mr. Bulfin paid a tribute to the loyalty of the staff in doing extra time and work without complaint.

CONTRACTS AND ORDERS.

The Leyland Company, Preston, have received an order for a motor fire-engine for South Shields Corporation, at £1,117.

Wolverhampton Council have accepted the tender of Messrs. Strachan and Henshaw, of Bristol, for the installation of ash-handling plant at the electricity works.

Keighley Council have placed contracts as subjoined:—Dorman, Long and Co., steel girders and other steelwork for foundations of new 5,000 kw. turbo-alternator, £132; H. V. Robinson, Ltd., construction of foundations for turbo-alternator, £1,217.

The Woods-Gilbert Rail Planer Company, of 2, Norfolk Street, London, W.C., are carrying out a contract for remodelling the rails of the Bexley Urban Council tramways. In the Woods-Gilbert process a special machine is used which deepens the groove, cuts down the guard lip and removes corrugations and the dish at joints. Bolton Tramways Committee have also entered into a contract with the company for the treatment of their rails in the same way. This contract was placed after the sub-committee had inspected the work done by the company at Wigan.

FINANCIAL REPORTS AND MEETINGS.

Auckland Tramways Company.—The directors have declared a dividend of 7*d.*, less tax, on the ordinary shares.

Lowestoft Corporation Tramways.—The revenue for the year ended March 31 was £9,457, or £2,273 less. Working expenses at £7,052 were down by £882. The net result was a deficiency of £2,669.

Improved Position at Colchester.—In consequence of the deficit on the tramways for the past year being only £402, the Tramways Committee have reported that it would probably be unnecessary to ask for aid from the rates this year.

Another Record at Glasgow.—The receipts for the week ended April 29, viz., £23,152, constitute a record for any ordinary week. In the preceding week the drawings totalled £23,065, while in the corresponding week of last year they were £22,169.

The Position at Rawtenstall.—Including £2,000 raised by a rate, the tramways undertaking has a surplus of £2,380 as the result of the past year's working. That sum is to be placed to the credit of the renewals fund, which is inadequate to meet the requirements of the undertaking.

Digitized by Google

Nelson Corporation Tramways.—The net profit for 1915-16 was £1,124 on an income of £10,151, as against £9,299 for 1914-15. Discount tickets have proved a popular feature, and the top-covered cars have been of such service that another is to be added during the present year.

Nottingham Corporation Tramways.—As the result of the working of this undertaking for 1915-16, the receipts show an increase of £16,000 in advance of the previous year, while the expenditure was £11,000 up. For the relief of the rates £20,350 instead of £22,500 is taken, and £13,000 is set aside for the reserve fund, which stands at £37,000.

Merthyr Electric Traction and Lighting Company.—The revenue for 1915 was £24,685, and after providing for debenture interest, and £2,000 for renewals, the surplus was £5,484, while £723 was brought forward. A dividend of 7 per cent. is proposed on the ordinary shares, adding £1,000 to the reserve, and carrying forward £906.

Brisbane Electric Tramways Investment Company.—The net profits for 1915, including £5,782 brought forward, were £95,667. There has been placed to a depreciation of investments fund £3,500 and a final dividend of 4s. per share, free of tax, on the ordinary shares is recommended, making for the year 8 per cent., £10,367 will be carried forward.

Salford Corporation Tramways.—Alderman Linsley, chairman of the Tramways Committee, has informed the Committee that the past year's trading gave a net balance in hand of £18,000, whereas they had expected £22,000. The decrease was due to the payment of dependants' allowances, and the increased cost of labour and materials. In order to meet their promise to contribute £22,000 to the rates the reserve fund would be drawn upon.

Lisbon Electric Tramways Company.—After deducting interest and amortisation due on the debentures, London office expenses, and directors' remuneration, the trading for 1915 shows a net profit of £59,917, which, with £2,883 brought forward, makes £62,800. A final dividend of 2 per cent. is recommended, making 4½ per cent. net for the year, carrying £8,736 forward. In order to meet this year's contribution to depreciation reserve, £25,000 has been transferred to that account from the exchange reserve.

Johnson & Phillips, Ltd.—Presiding at the meeting of this company on April 27, Mr. R. W. Blackwell alluded to the improvement in the accounts, which show a trading profit of £69,077. Owing to the conditions under which the company must be carried on for a considerable period to come, a larger dividend than 5 per cent., free of tax, on the ordinary shares, would not be justifiable, although the position of the company was financially sound and steadily improving. There was good reason, under existing conditions, to be satisfied with the future prospects. He did not believe that their company had either been advantaged or injured by the war to any appreciable extent.

Babcock & Wilcox, Ltd.—The directors recommend that the following dividends be paid for the half-year ended December 31, 1915:—3 per cent. on the preference shares, 2½ on the second preference shares, less tax, and 9 per cent. on the ordinary shares, tax free. The sum of £150,000 has been placed to reserve and £10,000 has been granted to the staff pension fund, leaving £42,125 to be carried forward. The company is short of men, and female labour is being introduced in some of the departments. Mr. J. Dewrance presided at the annual meeting on May 9. He stated they had £466,000 for appropriation, compared with £476,000 last year. The company were now a controlled establishment, and instead of making boilers and cranes, they were doing anything required by the Ministry of Munitions. The war, besides being a contest of trenches, was a war of factories, and those who were not doing their utmost were not doing their duty to the country.

Satisfactory Year at Blackpool.—For the twelve months ended March 31 the tramway receipts were £80,070, which is the third highest total in the history of the undertaking. The gross profit was £35,036, and after deducting interest and sinking-fund payment there is an available balance of £16,275. The record year was in 1913-14, when the net profit was £24,552, the next best year being 1912-13 with £17,664 net profit. As of late years the Tramways Committee have insisted on accumulating an adequate reserve fund, it is not expected that more than £8,000 will be devoted to the relief of the rates. That amount is equivalent to a 4*d.* rate. Alderman Brodie, chairman of the committee, in reviewing the financial statement on May 1, said that up to the second week in August the receipts gradually went down, showing a decrease of £9,000. The present year had begun well. At Easter the cars carried 21,000 more passengers than at any other period, and the receipts were double the previous year's. Owing to the lighting restrictions the electricity department's profit was only £2,000.

Cork Electric Tramways and Lighting Company.—Mr. E. Anderson, presiding at the nineteenth ordinary general meeting, stated that two 225 kw. generating sets had been removed in order to provide space for a new turbine. The gross receipts had increased by £2,301, or £1,920 in excess of the previous year. The lighting and power business continued to show very satisfactory progress, and the receipts from this source were £1,920 in excess. The revenue totalled £63,905. The expenses were very heavy, viz., £42,415—an increase of £4,457. This increase was due to the high price of coal and war allowances to the staff, involving charges amounting to £5,800. This amount was equivalent to 5 per cent. on the ordinary capital. After transferring £6,500 to the depreciation and renewals fund, writing off £1,804 for wiring consumers' premises and the depreciation of investments, and paying the preference dividend, there was a balance of £1,560. This was to be carried forward, together with £2,480 from the previous year. Mr. H. C. Levis and Captain W. Martindale were re-elected as directors.

Bournemouth Corporation Tramways.—The traffic receipts for 1915-16 amounted to £107,818, an increase of £5,472. The car miles run amounted to 1,670,702, a decrease of 144,930. The receipts work out at 15.49*d.* per car mile, as against 13.52*d.*, being an increase of 1.97*d.* The working expenses totalled £51,796, being at the rate of 7.44*d.* per car mile, as against 7.27*d.* for the previous year. The gross expenses amount to £89,181, as against £90,678 last year, the net balance being £19,337. From this figure must be deducted the allowance made to members of the staff who joined the forces, namely, £4,173, as against £2,352, and the capital charge and deficit on the running of the motor omnibuses, namely, £1,032, as against £1,188 last year, leaving a net profit of £14,132, as against £9,083. The Council at their May meeting adopted the recommendation of Mr. I. Bulfin, the general manager, that £10,000 be placed to renewals and £1,000 to reserve. The renewals fund stands at £13,000 and the reserve fund at £5,000. Just over £700 had been expended on renewals to cars, overhead equipment and power plant, and £2,000 on the permanent way. During the past five years the total profits amounted to over £50,000, or an average of over £10,000 per annum. This amount has enabled the reconstruction work on the Wimborne Road, Winton district, Charminster Road, and Holdenhurst Road to be carried out, resulting in very greatly increased revenue on those lines. The permanent way of the main section is satisfactory, but Mr. Bulfin states that as soon as normal prices prevail it will be necessary to reconstruct it.

BUSINESS NOTES.

The Zenith Carburetter.—With petrol so scarce it is the patriotic duty of all motorists to take every means of conserving it, and therefore the claims of the Zenith carburetter to save from twenty-five to fifty per cent. are worthy of investigation. A booklet giving details of what has been accomplished on most of the known engines by Zeniths will be sent post free to any motor user who will send his name and address to the Zenith Carburetter Co., Ltd., 40-42, Newman Street, London, W.

Small Power Motors.—From the Rugby works of the British Thomson-Houston Company, Ltd., we have received a copy of their new descriptive and illustrated list (No. 7,201) of small-power motors for alternating and continuous current. These motors have been developed to meet the increasing demand for machines of small capacity, which are cheap in addition to being efficient and reliable in construction. They have a liberal overload capacity, and will operate at their full rated load continuously with a low temperature rise. These alternating and direct-current motors are standardised for the following ratings:—

Circuit.	Type.	Horsepower.	Voltage.	Frequency.
Single-phase A.C.	S A	1/50 to 1/2	110 and 220	50 cycles
,, ,,	S D A	1/200 ,, 1/15	,, ,,	,,
Continuous Current	S D A	1/200 ,, 1/15	,, ,,	—
,, ,,	S D	1/50 ,, 1/2	,, ,,	—

Standard motors are of the protected type, but for special conditions totally enclosed motors can be supplied to order. Particulars of these can be obtained on application. The list also gives illustrations and descriptions of a 110-volt motor-driving drilling-machine, and 110-volt motor driving vertical spindle drill.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended April 29, the latest period for which full returns are available, give total receipts of £214,124, or £41,034 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £90 13s. per mile of single track, and last year at the rate of £75 11s., thus showing an increase for the week of £15 2s. per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. May 11.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	69¾	69
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	73/1½	73/9
4%	4%	Do. 4% Deb. ...	100	91	74½	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	73	73
5%	5%	Do. 5% Deb. ...	100	96	78½	78
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	19/6	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	95½	92½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	85	87½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$½	$1	Brazilian Trac. & Power Ord....	$100	66	55½	56¾
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92	92½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	89/4½	89/4½
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91½	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	35
6%	5%	Do. Pref. Ord....	100	106	39¾	39¾
5%	5%	Do. 5% Cum. Pref.	100	103	55	54¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80¾
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	61½	62¾
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	71½	71
70/-	70/-*	Do. 7% Pref.	100	55½	47½	48
—	—	Do. 6% Pref. Ord.	100	17½	17	16½
—	—	Do. Def. Ord.	100	11	9¾	9¾
5%	5%	Do. 5% Deb.	100	92	78¾	79
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	68xd	70½xd
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	94½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6 1/16	6½
1/3	1/3	City of B.A. Trams.	5	5½	91/6	92/3
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11	11¾
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	¾	1/9	1/9
5/6	6/-	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅝d.	9⅝d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	15/64	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	9/-	8/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89	89¾
5%	5%	Do. 5% Inc. Deb.	100	88½	79½	78¾
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	49½	49½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/3	98/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70	70
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½	79½
$1½	$1½	Mexico Trams. Common ...	$100	70	24¾	25¼
5%	5%	Do. 1 Mt. 5% G.B.	—	84	39½	39½
6%	6%	Do. 6% Mt. Bds.	100	76	35	34¼
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94	92½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	93xd	94¼xd
1/2*	1/2½*	National Steam Car	1	15/32	15/-	14/-
9⅝d.*	9⅝d.*	New General Traction	1	½	7/9	7/9
6d.	8⅝d.	Northern Gen. Trans. Ord. ...	1	29/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	55/-	55/-
5%	5%	Do. 5% 1st Deb.	100	89½	75	75
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	15/32	10/7½	10/7½
8d.	10d.	Provincial Trams. Ord.	1	½	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	90	90
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74½	74½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	88½
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	78½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	94	94
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	86
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	91¾	91
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	73	74
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Aggregate. Increase or Dec.
Anglo-Argentine	May 6	£54,791	£54,938	19	£921,187	— £1,000
Auckland (28 days)	Apr. 7	20,216	20,767	40	210,704	+ 3,553
Ballarat and Bendigo ...	Feb. 27	3,469	3,512	48	39,843	— 2,718
Brazilian Traction Mlrs.	Mar.	6,294,910	6,711,000	13	19,220,000	+ 1,131,400
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia $	Mar.	557,135	577,117	39	4,982,147	— 772,894
Buenos Aires Lacroze ...	Apr. 10	41,765	40,220	43	413,102	— 8,139
Burmah Tramway ... Rs.	May 8	3,641	3,732	40	...	+ 7,193
Calcutta Rs.	,, 6	60,878	69,152	19	1,221,818	+ 79,095
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	Apr.	1,496	2,513	18	9,930	+ 3,272
Cordoba	Mar.	12,746	13,598	52	161,906	+ 6,251
East India	Apr.	1,864	2,116	39	18,706	+ 1,466
Hong Kong $	Apr. 8	10,122	13,058	17	185,764	+ 23,759
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Mar.	34,185	34,159	13	101,073	+ 3,681
Lisbon Escu.	Mar.	...	175,706	13	522,600	...
Madras (2 weeks) Rs.	Apr. 30	30,370	32,361	17	251,470	+ 23,409
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Mexico $	*	...	...	...	...	...
Montevideo	Apr.	26,786	28,997	26	187,419	+ 12,764
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Apr.	4,964	4,849	18	19,787	— 74
Shanghai $	Apr. 5	24,690	28,327	...	...	...
Singapore $	Apr. 1	10,817	11,045	13	157,154	+ 19,111
Toronto $	Mar.	820,750	910,969	13	2,663,575	+ 232,148
Winnipeg	Mar.	303,209	296,500	13	887,310	— 81,239

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	Apr. 25	£310	£444	+ £134	4	£1,432	+ £74
Aberdeen Corporation...	May 3	1,794	1,997	+ 203	48	85,614	+ 5,476
Accrington Corp.	Feb. 2	443	534	+ 91	44	24,521	+ 1,014
Ayr Corporation	May 6	292	317	+ 25	51	17,973	+ 1,230
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 7	1,315	1,420	+ 105	5½	7,695	+ 494
Birmingham Corp.	,, 6	12,915	15,680	+ 2,764	5	84,236	+ 14,133
Do. Motor Omnibuses	,, 6	786	833	+ 46	5	4,587	+ 534
Blackburn Corp.	,, 3	1,188	1,328	+ 140	5½	7,211	+ 223
Blackpool & Fleetwood.	,, 6	439	620	+ 181	18	7,348	+ 886
Blackpool Corp.	,, 4	1,113	1,546	+ 433	5	7,745	+ 2,230
Bolton Corporation	,, 7	2,735	2,684	— 51	6	15,636	+ 507
Bournemouth Corp.	,, 10	2,011	2,055	+ 44	6	13,031	+ 9
Bradford Corporation	,, 6	6,131	6,300	+ 169	5	35,741	+ 478
Brighton Corporation	,, 7	999	1,066	+ 67	5¾	5,944	+ 424
Bristol	,, 5	9,357	9,822	+ 465	18	167,620	+ 9,999
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 6	1,555	1,705	+ 150	6	10,518	+ 1,048
Burton-on-Trent Corp.	,, 7	282	258	— 24	5	1,337	— 145
Bury Corporation	Apr. 30	1,334	1,607	+ 273	4¾	6,503	+ 171
Cardiff Corporation	,, 22	2,426	2,693	+ 267	3	8,763	— 92
Chatham & District	May 4	1,172	1,235	+ 63	18	19,461	+ 1,090
Chesterfield Corp.	Apr. 27	247	365	+ 118	4	1,140	+ 101
Colne Corporation	,, 29	232	314	+ 82	...	...	...
Cork Electric	May 4	521	541	+ 20	18	8,183	+ 7
Croydon Corporation	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	May 6	1,001	1,048	+ 47	5½	5,810	+ 236
Dover Corporation	,, 6	297	306	+ 9	5	1,562	— 1
Dublin & Lucan	,, 5	142	69	— 73	18	2,098	— 228
Dublin United	Apr. 14	6,326	5,989	— 337	15	87,417	+ 3,402
Dundee City	May 3	1,277	1,336	+ 59	50½	68,248	+ 3,756
East Ham Corporation	,, 6	1,348	1,289	— 59	5½	6,658	+ 202
Exeter Corporation	,, 5	366	371	+ 5	5	1,872	+ 30
Glasgow Corporation	,, 6	22,179	23,175	+ 996	49	1,066,137	+ 76,417
Glasgow Subway	,, 6	1,101	1,186	+ 85	18	22,297	+ 2,603
Glossop (U. Elec. Supp.)	,, 6	137	138	+ 1	19	2,488	+ 359
Halifax Corporation	,, 2	2,067	2,280	+ 213	4½	10,767	+ 217
Do. Motor Omnibuses	,, 2	48	44	— 4	4½	211	— 32
Hastings & District	,, 5	902	1,027	+ 125	18	14,397	+ 379
Huddersfield Corp.	,, 6	2,560	2,687	+ 127	5	15,054	+ 1,888
Hull Corporation	,, 6	3,027	3,002	— 25	5	15,734	— 1,016
Ilford U.D.C.	,, 6	641	693	+ 53	5	3,610	+ 388
Ilkeston Corporation	,, 11	126	125	— 1	6	779	+ 51
Ipswich Corporation	,, 6	441	441	nil	5	2,470	+ 207
Isle of Thanet	,, 6	335	314	— 20	31	8,152	— 1,238
Kilmarnock Corp.	,, 6	165	171	+ 5	51	8,486	+ 344
Lanarkshire	,, 4	1,855	2,400	+ 545	18	38,725	+ 6,740
Lancashire United	,, 3	1,640	1,793	+ 153	18	29,645	+ 1,864
Leeds City	,, 6	8,525	9,160	+ 635	6	50,492	+ 6,367
Leicester Corporation	,, 6	3,097	3,259	+ 162	18	58,597	+ 7,218
Leith Corporation	,, 6	716	774	+ 58	51	39,301	+ 3,672
Leyton U.D.C.	,, 4	1,620	1,559	— 60	4	8,163	— 45
Liverpool Corporation...	,, 6	13,340	14,024	+ 684	18½	242,038	+ 12,482
Llandudno & Colwyn B.	,, 5	317	307	— 10	22½	4,891	— 164
London County Council	Mar. 29	46,463	44,069	— 2,394	51⅔	2,299,705	— 27,382
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	May 6	156	141	— 15	30½	3,980	— 1,158
Maidstone Corporation..	,, 4	205	219	+ 14	5	1,168	+ 12
Manchester Corp.	,, 6	17,777	18,406	+ 629	5	96,185	+ 6,382
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	Apr. 22	169	269	+ 100	3½	737	+ 62
N'castle-on-Tyne Corp.	May 6	6,019	5,980	— 39	5	31,385	+ 564
Newport (Mon.) Corp.	,, 6	804	866	+ 62	5	4,702	+ 1,127
New St. Helens & Dist.	,, 3	902	972	+ 70	44	43,882	+ 3,423
Northampton Corp.	,, 5	804	747	— 57	5	3,481	— 247
Nottingham Corp.	,, 4	3,510	3,692	+ 182	5	18,791	+ 669
Oldham Corporation	,, 7	2,244	2,267	+ 23	5	15,583	+ 910
Portsmouth Corp.	Apr. 29	2,399	3,297	+ 898	5	11,211	...
Preston Corporation	May 3	922	1,099	+ 177	4¾	5,024	+ 403
Provincial	,, 9	2,193	2,244	+ 51	31	65,145	+ 4,246
Reading Corporation	,, 4	751	844	+ 93	4¾	3,951	+ 375
Rhondda Tramways	Apr. 13	1,238	1,195	— 44	15	17,223	+ 486
Rochdale Corporation...	May 6	1,697	1,647	— 50	5½	9,755	+ 470
Rotherham Corp.	,, 10	1,023	1,292	+ 269	5¾	7,987	+ 1,948
Salford Corporation	,, 8	5,108	5,144	+ 36	5¾	29,296	+ 1,715
Sheffield Corporation	,, 7	8,449	9,652	+ 1,203	6	61,499	+ 10,362
Southampton Corp.	,, 3	1,383	1,615	+ 232	4¾	7,286	+ 442
Southend-on-Sea Corp...	,, 3	777	755	+ 22	5	3,735	— 306
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 6	723	728	+ 5	5½	4,082	+ 250
Sunderland Corp.	May 7	1,376	1,396	+ 20	5	8,133	+ 262
Sunderland District...	,, 3	574	527	— 47	27	15,496	+ 1,079
Swindon Corporation	,, 3	197	201	+ 4	4¾	938	+ 63
Torquay Tramways	Apr. 27	559	862	+ 303	17	7,593	— 48
Tyneside Trys. & Tmrds.	May 3	570	514	— 56	18	9,077	— 286
Wallasey Corporation	,, 6	1,212	1,282	+ 70	5½	6,851	+ 321
Walsall Corporation	,, 6	704	754	+ 50	19	14,365	+ 2,031
Walthamstow U.D.C.	,, 6	874	1,026	+ 152	5	5,484	+ 1,075
Warrington Corp.	Apr. 27	420	525	+ 105	4	1,911	+ 245
West Ham Corporation	May 4	3,186	3,190	+ 4	4¾	15,818	+ 813
Wigan Corporation	,, 4	1,469	1,575	+ 106	5	8,166	+ 472
Wolverhampton Corp.	,, 10	1,037	1,138	+ 101	6	6,994	+ 853
Yorkshire (W. Riding)...	,, 7	1,646	1,779	+ 133	19	31,311	+ 3,135

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 26.] LONDON, SATURDAY, MAY 20, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

THE GREAT NORTHERN RAILWAY COMPANY.

STORES CONTRACTS.

The Directors are prepared to receive Tenders for the supply of certain New Stores for six and twelve months from July 1 next.

A list of the Contracts, and separate forms of Tender for each Contract, may be obtained upon application to Mr. Weeks, the Stores Superintendent, Doncaster, by whom every information will be furnished.

The stores must be in every case equal in quality to the Company's sealed samples and patterns, which will be exhibited in the Stores Department, Doncaster, where they may be inspected, on application to the Stores Superintendent, from Monday, May 22, to Friday, May 26, inclusive, between the hours of 10 a.m. and 4 p.m., and the Contractors are requested to call and examine them before tendering.

The Company's samples and patterns cannot be sent to Contractors for inspection.

Tenders, addressed to the Stores Committee, marked on the outside with a description of the Stores tendered for, must be sent to the Company's Offices at King's Cross, in the envelopes specially provided, so as to be received by not later than 9.30 a.m. on Monday, May 29, 1916.

The Directors do not bind themselves to accept the lowest or any Tender. E. BURROWS, Secretary.

Secretary's Office, King's Cross Station, London, N.
May 17, 1916.

CITY AND COUNTY BOROUGH OF BELFAST.

MECHANICAL STOKERS.

The Tramways and Electricity Committee of the Belfast Corporation are prepared to receive Tenders for the supply of Chain Grate Mechanical Stokers.

Specification, with form of contract, may be obtained from Mr. T. W. Bloxam, City Electrical Engineer, East Bridge Street, Belfast, on deposit of one guinea for each specification. This deposit will be refunded, provided a bona-fide Tender has been sent in and not withdrawn.

Extra copies may be obtained at 10s. each, which sum will not be returnable.

Sealed Tenders, endorsed "Tender for Mechanical Stokers," to be lodged in the Town Clerk's Office, City Hall, Belfast, not later than 10 a.m., on Wednesday, May 24, 1916.

An official receipt must be obtained for every Tender delivered by hand. Tenders sent by post must be registered.

The Council do not bind themselves to accept the lowest or any Tender.

BY ORDER.

FOR SALE.

Copper Trolley Wire, for immediate disposal from stock, 5 tons 4/0 grooved, standard tests, one-mile reels.
Edward Le Bas and Co., Dock House, Billiter Street, London, E.C.

BURGH OF LEITH.

TRAMWAYS DEPARTMENT.

OVERCOATS.

The Town Council invite tenders for Overcoats, Factory or Tailor made, as may be determined (for the following), viz.:—3 Inspectors; 22 Motormen; 29 Conductors; 20 Female Conductors; and for 50 Oilskins—all conform to samples to be seen and relative Conditions of Contract, to be obtained at the Tramway Offices, 165, Leith Walk.

Tenders, endorsed "Overcoats," along with separate samples marked with a private mark (which shall not be recognised until the tenders are opened) must be lodged with me not later than June 12th next.

The Council do not bind themselves to accept any tender.

D. ROBERTSON, Town Clerk.

Town Clerk's Office, Leith. May 18, 1916.

POSITIONS VACANT.

COUNTY BOROUGH OF EASTBOURNE.

ELECTRICITY DEPARTMENT.

MAINS ENGINEER.

The Electricity Committee invite applications for the position of Mains Engineer at a salary of £156 per annum. The appointment will be permanent, subject to a month's notice on either side.

Applicants must have had a sound mechanical and electrical engineering training and must have had experience with a system employing single-phase high and low tension mains distribution.

Applications, written on foolscap, stating age, whether married or single, and giving full particulars of training and experience with dates in chronological order, accompanied by copies of not more than three recent testimonials and endorsed "Mains Engineer," to be sent by post only to the undersigned not later than 5 p.m. on Friday, June 9, 1916. J. K. BRYDGES,

Electricity Works, Borough Electrical Engineer.
Eastbourne. May 18, 1916.

BOROUGH OF ECCLES.

ENGINEER.

The Electricity Committee require an Engineer to take charge of the working of the plant in their Electricity Generating Station during a daily 8-hours' shift. The appointment is a permanent one. Wages 45s. per week of 56 hours, rising to 50s. per week at the expiration of six months' approved service.—Applications, endorsed "Engineer," stating age, experience, and when able to commence duty, accompanied by copies of not more than three recent testimonials, to be addressed to the Borough Electrical Engineer, Electricity Works, Cawdor Street, Patricroft, Lancs, and forwarded so as to arrive not later than Wednesday next, the 24th inst.

BOROUGH OF BEDFORD.

ENGINEER-IN-CHARGE.

Engineer-in-charge required for H. T. Alternating Station. Turbine experience essential. Wages £2 to £2 5s., war bonus 1s. 6d. Extra shifts paid. Applicants must be ineligible for military service.

Applications, stating age, experience, etc., accompanied by copies of testimonials and endorsed "Engineer-in-charge," to be sent to the undersigned not later than May 25.

R. W. L. PHILLIPS, A.M.I.E.E.

Electricity Works, Caudwell Road, Bedford.

SHIFT ENGINEER.

Shift Engineer required for small Traction and Lighting Station. Must be able to keep plant in running order. Applications, stating age, experience and wages required, to be sent to the Manager, Great Grimsby Street Tramways Company, Cleethorpes, Lincs.

FOREMAN PLATELAYER.

Wanted, Working Foreman Platelayer, permanent job. Apply, giving particulars of experience and wages required. Engineer and Manager, Rhondda Tramways Company, Ltd., Porth, Glam.

SECOND-HAND CARS.

Advertiser requires information of secondhand double deck or single deck cars (the former preferred) for sale. Reply, giving particulars of prices of cars, with spares available, including prices to contractor.—Box No. 38, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

Digitized by Google

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.

Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World
Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MAY 20, 1916.

INOPPORTUNE TIME FOR CONCESSIONS.

A questionable proposal has been referred to Southampton Tramways Committee by the Corporation. It is of a nature wholly opposed to the cautious policy that should prevail among tramway undertakings throughout the country at this time. While several corporations and companies have deemed it advisable to increase fares, a number of members of Southampton Council seem inclined to favour a proposal to lengthen the penny stages. The author of the project does not appear to have given very careful consideration to the results that may ensue. What increase there was in the receipts during the past year is plainly due not to a normal development but to activity connected with the war. The whole sum is less than £9,000, against which there is an increase of over £3,000 in expenditure, while since the estimates were framed for the current year an additional £2,000 has been demanded for increased charges for energy and a further £1,000 for the higher income tax. When to these demands are added the sum of £4,348 for war service allowances paid out of income last year, and £5,017 as the estimated sum on that account for the present year, it will be seen that the Tramways Committee are asked to take risks upon which no prudent man would venture. Apart from the foregoing items, there is another financial consideration that should lead the Tramways Committee to refrain from any concession at this time. With a capital expenditure of £259,834 incurred in sixteen years, of which about £100,000 has been repaid, the Committee had accumulated up to March of last year only a sum of £14,251 for depreciation, renewals, and reserve. That amount was reduced to £9,106 during the past year owing to the expenditure on reconstruction works, apart from an outlay of £10,603 out of revenue in order to repair and maintain the permanent way, overhead cables, the cars and their equipment, the depôts, etc. For an undertaking comprising in single track a length of only eighteen miles these items are an indication of further liabilities that will have to be met during the next few years, and unless a determined effort is again made to build up the depreciation fund there will be increasing difficulty in meeting those demands. The undertaking is approaching the period when such outlay will be very heavy, as Alderman Dunsford, the chairman of the committee, informed the Corporation at the meeting at which the question of concessions was under consideration. For the year just ended the unappropriated balance, after meeting the year's expenditure, was less than £8,000, and no appropriation was made for depreciation fund. This is significant when it is recalled that in 1910 the depreciation fund stood at £20,000. Besides the chairman's warning as to renewals and other work, there were several points in his remarks to which the Council would be well advised to pay regard. One is that the increased traffic of the past two years is clearly abnormal, and that it might cease at any moment, leaving the undertaking to face the heaviest depression that it has experienced. This expectation is held by the majority of business men, and even should it not be fully realised the position of tramway authorities will be rendered more secure by prudent action at the present juncture. Although in the past the Southampton Committee have never granted a concession unless they were certain that the receipts would cover the expenses and also leave a balance for depreciation, it cannot be claimed that the amount available for the latter purpose has been adequate. A continuance of this wise policy is very desirable while the war lasts, especially as the general manager has a scheme of his own for the introduction of the universal penny fare, with some re-organisation of routes and the abolition of transfers. This is an innovation that Mr. Robson carried out with great success at South Shields, with the result that it has improved the finances of the undertaking year by year. Mr. Robson has a record of service and a sufficiently lengthy experience of Southampton to enable him to be the best judge of the town's requirements, and it may jeopardise his plan if the Council permit preliminary experiments to be made. The strongest condemnation of such a course is to be found in a paragraph in Mr. Robson's report, viz., that the change he proposes should not be made until expenses are again more or less normal, and an unlimited amount of cars and labour are available. The general manager is on safe ground also in advising that at the present time the department cannot afford to make any reduction in fares.

LEEDS TRAMWAYS AND GOODS CONVEYANCE.

Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways, in presenting his annual report to the Tramways Committee, on May 15, observed that since October last the tramways had been utilised for carrying fireclay and coal from the Leeds Fireclay Company's mines at Harehills to their works at Wortley and Elland Road. This commencement in the carriage of goods traffic for the general public, Mr. Hamilton states, marks an important era in the development of the business of the tramways undertaking. In the local Acts of Parliament, the very fullest powers for conveyance of goods, minerals, etc., upon the tramway lines have been carefully provided for, and no doubt this will in the future be found to be most valuable in serving the citizens. Owing to the contour of the district, all the railways and canals are placed in the southern half of the city, leaving considerable districts, chiefly residential, which are long distances from the railway and goods termini. A properly devised scheme (adds Mr. Hamilton), by utilising the powers of the tramway undertaking to convey minerals and goods over its routes, would undoubtedly lower the cost of conveyance of materials to and from such districts, and very much reduce the wear and tear of the public highways.

The Committee requested the general manager to report fully on the prospects of utilising the tramways in this way.

Digitized by Google

APPLICATIONS TO THE TRIBUNALS.

Mexborough and Swinton Tramways Company applied to the Rawmarsh Military Tribunal for the exemption of five employees, four at the generating station, and one motorman. Two of the former were switchboard attendants, and in reply to the military representative Mr. P. Priestley, the manager and engineer, said he did not think there was a woman working a switchboard in any station in this country. The military representative said he knew of girls attending switchboards in important places, such as theatres. With a little training he thought they could do the work of these men. In reply to a suggestion Mr. Priestley said there was great difficulty in the way of securing ineligible men, and considerable training would be needed. Exemptions were granted in each case until the end of June, and the military representative undertook to ascertain whether the men were exempt as employees of a public utility service.

Exemption was applied for in the case of the only traffic clerk remaining on the Dover tramways' staff. The application was granted until May 29 to enable a substitute to be found.

Mr. F. H. Corson, general manager and electrical engineer, Gloucester Corporation Tramways, applied in that city for the exemption of a motorman. In reply to a suggestion that women might be trained to do the work, Mr. Corson said it was a question whether they should be so employed, but the time was quickly approaching when the point should be settled. The military representative, ascertaining that the service was normal in spite of the war, suggested that it should be curtailed in order to release more men. The tribunal adjourned their decision with a view to the tramways department considering whether they could release any of their thirteen attested motormen.

There was an appeal by the military authorities at Oxfordshire Appeal Court against the exemption of a motor-omnibus fitter employed by Oxford Tramways Company. It was asserted that the man only did the work of a mechanic, but Mr. A. A. Tyler, the manager, gave contrary evidence, and added that the vehicles which the man attended to were placed at the disposal of military hospitals free of cost. While dismissing the appeal the court shortened the period of exemption until November 2.

Three car drivers were appealed for at Southend by Mr. R. Birkett, the general manager and electrical engineer. In reply to the military representative he said he had five men under training, and the representative said he could get twenty men next week. Mr. Birkett answered that he had had other men apply but they were physical wrecks. The men were granted conditional exemption as being in a certified occupation.

THE EMPLOYMENT OF WOMEN.

Sheffield Tramways Committee have authorised the general manager to employ forthwith women car cleaners on night work at the depôts, at the same rate of pay as men, viz., 7*d.* per hour, plus 2*s.* war allowance per week. The women are to work 45 hours a week.

Mr. J. M. McElroy has spoken in high terms of the manner in which the women conductors work at Manchester. Fewer complaints are lodged proportionately than against the men. There is, however, a desire to assist them by the public. There had been comparatively little illness among them. Before being employed they are examined by Dr. Catharine Chisholm. This lady has approved of the summer uniform, the main change in which is a short jacket in place of the overcoat. A straw hat is provided.

At Dover, says Mr. E. Carden, the tramways manager, all complaints respecting conductors had practically ceased since the recent appointment of women.

Portsmouth's 150 women conductors are to have dark grey uniforms and putties for the summer.

Liverpool was one of the last places to engage women for car conducting. There are now over 300 of them. They sent a deputation to the management, asking to be treated exactly like the men, and their work is described as eminently satisfactory in every respect.

Councillor H. Halsall, chairman of Birkenhead Tramways Committee, has stated that inspectors had specially checked the women's paysheets and had found there were very few cases where they had missed fares. The management considered the women were doing their duty very satisfactorily.

Attired in overalls, the women conductors of the Blackpool and Fleetwood Tramways Company have painted the railings of the enclosed portion of the track.

In view of the impending opening of the Hull Road route at York, the Tramways Committee have recommended the Council to allow the manager to engage from six to eight women drivers. Several women have been trained to the work.

PROVISION OF LOOPS AND CROSSINGS.

At Sheffield Munitions Court a tramway rail fitter and a toolroom fitter applied for leaving certificates to enable them to enter a munition factory. They contended that the tramway lines and crossings castings which they were engaged upon at Messrs. Edgar Allen & Co., Ltd., were not war work. Mr. Wells, senior, for the company, said it was an understood thing between firms on tramway work and the Government that they should provide the material for keeping in proper order the loops and crossings for tramways to munition factories. Over 90 per cent. of the tramway work of Messrs. Allen was of this character, and was Class "A1" for the Government. It was a question of money with the toolroom fitter. He (Mr. Wells) had had his knuckles rapped by the Ministry of Munitions for paying such high wages to toolroom fitters, for the standard was 42*s.* plus 4*s.* On the ground that tramways were sufficiently important munition work the Court refused the applications.

L.C.C. TRAMWAY MATTERS.

The London County Council held their first meeting after the Easter recess on Tuesday, when various reports and information relating to the tramways department were submitted by the Highways Committee.

GREENWICH GENERATING STATION WORK.

The Highways Committee reported that they had arranged for blades of a heavier section, laced together, to be substituted for the high pressure blades in the first and second expansions of turbines Nos. 5 and 6. The new blades are being manufactured by Messrs. Willans and Robinson, the makers of the machines. A pair of grates to be fitted with a new type of stoker link, are to be obtained, the links being supplied by E. Bennis and Company, Ltd. Two machines for breaking up coal are being supplied by W. J. Jenkins and Company, Ltd.

Tenders for the foundations for the turbo-generators at Greenwich station have been obtained, and it is estimated that the expenditure will amount to about £5,250.

CONTRACTS AND TENDERS.

On July 30, 1913, the Council accepted the offer of Dick, Kerr and Company, Ltd., to execute the roadwork and platelaying in connection with the reconstruction of tramways in Ball's Pond Road between Southgate Road and Kingsland Road. The Highways Committee now reported that they have agreed the cost at £7,696.

The value of the special track work obtained during 1915 from Hadfields, Ltd., under their contracts was £6,904 17*s.* 11*d.* for tramway construction and reconstruction work, and £29,100 14*s.* 6*d.* for renewals and maintenance purposes, being a total of £36,005 12*s.* 5*d.*

During the quarter ended March 31, 1916, 36,180 tons of coal for use at the Greenwich generating station were purchased, at a cost of about £48,038.

Tenders from selected firms for carrying out certain work required for adapting Evelyn Street, Deptford, depôt for the accommodation of trailer cars were received, and that of Messrs. Fred. and T. Thorne, at £1,796, was accepted.

Tenders have recently been received for the supply of driving wheel and pony wheel steel tires, but the Committee decided not to accept any of the tenders. The purchase of tramway materials, etc., and the execution of small works and repairs, at an estimated cost of £38,648 has been sanctioned. Tenders for the purchase of sixty-two lots of old tramway plant and materials have been accepted, the total amount realised being £5,167.

MISCELLANEOUS.

The Highways Committee have authorised the continuance of the employment until October 31, 1916, of a temporary inspector in the chief engineer's department, engaged in supervising the manufacture of rails, at a rate of pay not exceeding £5 5*s.* a week.

The publication of the tramways map and guide has been suspended until the termination of the war.

The Highways Committee reported that five persons had been fined for obstructing tramcars.

The two instructors of the classes held at the central car repair depôt for apprentices and other boys employed at the depôt having been granted leave of absence to undertake work in connection with munitions of war, the classes are to be discontinued during the period of the war, unless it be found practicable to provide for the regular attendance of two teachers.

PRAISE FOR THE TRAMWAY MANAGEMENT.

The Chairman of the Highways Committee was asked if the action taken to deal with the additional traffic thrown on the tramways through the closing of the South-Eastern and Chatham stations had been satisfactory, and Mr. G. H. Hume, in reply, read a letter from the National Association for the Extension of Workmen's Trains and Tramways, thanking the Council and the tramway managers for the successful efforts to increase the tramway services. The additional accommodation provided had been much appreciated by the work-people. In reference to the approaching closing of certain G.E.R. stations, Mr. Hume stated that the Highways Committee were reporting to the effect that so far as the traffic was directed to Aldgate there would be no difficulty in accommodating the passengers, although the tramways were unable to offer to passengers to Liverpool Street a convenient and direct service equivalent to that afforded by the railway. The authorities concerned in through running would have no objection to the Council turning some cars back at Bow, to avert overcrowding, and experiments in that direction would be made.

On the report of the Housing of the Working Classes Committee as to the closing of the G.E.R. stations, it was pointed out that n several respects the tramways could afford no direct accommodation for the 2,000 displaced railway passengers. It was resolved to make further representations to the company, and Mr. Holland, Chairman of the Committee, undertook to see the Board of Trade.

OBJECTION TO FREE PASSES.

On the report of the Highways Committee to the effect that they had continued the granting strips of fourteen penny tickets to special constables, and free passes to division and assistant division commanders and members of the headquarter staff of the special constabulary in the Council's area, Mr. H. Marks moved an instruction to report as to the desirability of discontinuing these passes and facilities, but on Mr. Hume undertaking to give the Council an opportunity of deciding the matter before September next, the amendment was withdrawn, and the Committee's report was received. All other tramway reports were adopted.

Digitized by Google

THE BRADFORD GOODS WAGON.

The equipment of the chassis of the Bradford railless trolley battery vehicle is, we learn from Mr. C. J. Spencer, general manager of the Corporation Tramways, identical with the ordinary railless trolley chassis as used on the Bradford Tramways. There are two twenty h.p. motors with ordinary series-parallel control, which therefore operate on a 500 volt circuit. The earthing device is an extension of the steering arm of the vehicle bearing on the track by the medium of a cast-iron block, and at the same time automatically steering the vehicle. This device Mr. Spencer has used with considerable success for some time in connection with the ordinary trackless trolley cars when the vehicles are taken over the tramway routes to the depot. It was designed by Mr. E. Cross, general manager of the Rotherham Tramways. The accumulators employed are of the Edison type, comprising 120 cells, giving a normal voltage of 150. These supply current to the ordinary 500-volt motors, the only difference being that the motor with battery supply runs correspondingly slower, that is, *pro rata* to the voltage. As the torque of a series motor is proportional to the current passing through the windings the vehicle is capable of climbing steep gradients, though at a speed corresponding to the low voltage. Whilst the vehicle is running on the 500-volt circuit the batteries may be in serie with the motors, thus charging them whilst the car is in trolley sservice. The batteries are capable of running the vehicle about ten miles. The change over from battery to overhead wire is effected simply by throwing over a switch, the putting of the trolley on the wire, and the earth-connector on to the steering gear.

THE SUMMER TIME ACT.

To-night all public clocks will be advanced one hour. Normal time will be resumed on the night of September 30—October 1, when clocks will be set back from 3 a.m. to 2 a.m. Notices of the alteration of time in the night of Saturday—Sunday, issued by order of the Home Secretary, were distributed on Thursday throughout the country, and are being displayed on public buildings, at the railway stations, and elsewhere. The official notice repeats that at 2 a.m. on Sunday the time will be put forward one hour to 3 a.m. The altered time will be used for all ordinary purposes during the summer. The chief object of the measure, it is officially explained, is to reduce the number of hours during which artificial lighting is used in the evenings, and so save to the nation part of the fuel and oil for lighting and release large quantities of coal which are urgently needed for other purposes. In a letter to local authorities the Secretary to the Local Government Board draws attention to the fact that the Act gives certain special powers to the appropriate Government Department to make adjustments in certain circumstances in the time fixed by any by-law, regulation, or other instrument. This power will no doubt be useful to remove public inconvenience in certain cases.

MISCELLANEOUS NEWS AND NOTES.

Aircraft Risks Insurance.—Glasgow Tramways Committee have authorised the general manager to insure the works and properties of the department againt aircraft risks.

Dublin Tramways.—The military authorities allowed the full tramway service to be resumed in Dublin on May 15. The last cars start 15 minutes earlier than was the case before the revolt.

Trailer Cars for the Metropolitan Company.—The application made by the Metropolitan Electric Tramways Company, Ltd., for authority to run trailer cars has been sanctioned by the Board of Trade.

Charge for Energy.—Torquay Electricity Committee have adjourned until August next further consideration of the proposal to increase the charge made for energy supplied to the Tramways Company.

An Offer for Oldham Omnibuses.—A firm at Colwyn Bay offered to hire the omnibuses owned by Oldham Corporation for certain periods of the year. The offer has been refused by the Tramways Committee, and a member stated that if they sold the vehicles it would only be to secure more adaptable ones.

Tramway Breakdowns at Edinburgh.—The Burgh Engineer reported at a meeting of the Tramway Committee of Edinburgh Town Council on May 17 that there had been 51 breakdowns in the cable system during the past three weeks. This was equal to 2½ per day, as compared with three per day for the previous three weeks.

Belfast Tramway Managership.—At the meeting of the Tramways and Electricity Committee of the Belfast Corporation on May 17, presided over by Councillor John M'Caughey, the Town Clerk submitted forty-two applications received for the position of general manager of the tramways. They were referred to a sub-committee for report.

Moscow Tramways Extension.—The Town Council of Moscow intends in the course of the coming summer to extend the tramways system considerably, at a cost of about a million roubles (£106,000). The work will be much facilitated by the fact that the town has a large stock of rails that had been removed from Riga during the German invasion last year, as well as a quantity taken from a factory that was rolling rails for the town of Unisk.

New Generating Set at Greenock.—The Westinghouse Company have installed a 5,000 kw. Westinghouse Rateau steam turbo generating set at the Corporation electricity works, the set being a duplicate of one installed two years ago. Mr. W. J. Poole represented the contractors at the starting of the new set, when Councillor D. McCullum mentioned that the Corporation had just sought borrowing powers for £45,000 for the purchase of cables, boilers, etc.

Roads Improvement Association.—This organisation, which is controlled by motorists, states in their annual report that "the London County Council have abandoned their scheme to construct a third line of tramway track in Blackfriars Road as the result of the Association's opposition, the Association considering the project a particularly objectionable and dangerous one to general road users."

Mexico Tramways.—The undertaking of the Mexico Tramways Company has been restored to the control of the company's officials now that the condition of the country has become more peaceful. The committee formed in London for the protection of the holders of the securities of the Mexico Tramways, Light and Power Groups, have extended the time for the deposit of bonds until June 30. Bonds amounting to over £5,400,000 have already been deposited.

Trailer Cars at Birmingham.—A trial inspection of a trailer car was made in Birmingham on Monday, principally over the Witton route. This car, combining a single decker with a double decker, attracted considerable attention. Members of the Council, Mr. Alfred Baker, general manager, and other officials of the tramways department were the only passengers. It is stated that further experiments will take place before the trailer will be brought into regular use.

Accidents at Birmingham and Gateshead.—At the junction of Suffolk and Navigation Streets a Birmingham tramcar left the rails on May 14 and knocked down a standard carrying the trolley wires. Following a steep descent, there is a sharp curve at this point. The car was considerably damaged, and half a dozen passengers received slight injuries. A Gateshead car descending the steep hill at West Street terminus on May 14 was not pulled up in time, with the result that it collided with another car standing opposite the railway station.

Lights on Vehicles.—The recent Order of the Secretary of State prescribes the use of three lamps on vehicles, two in front (white) and one at the rear (red). The number of accidents that have happened in the past clearly shows the necessity for this Order, but the Commissioner of Police of the Metropolis has hesitated to press it unduly on account of the difficulty that has been experienced in obtaining lamps. He is now satisfied, however, that suitable lamps can be easily obtained, and from June 1 next the police will be instructed to enforce the law.

Oxford Omnibus Company Sued for Extraordinary Damage.—In the King's Bench Division on May 9 counsel for Abingdon Rural Council applied for postponement of the hearing of their action against the City of Oxford Electric Tramways Company for damages caused by the extraordinary traffic of motor omnibuses. Counsel said it was necessary to prove the number of omnibuses. Plaintiffs had not been able to get the information from the time-tables, and so it would have to be obtained by interrogatories. Mr. Justice Scrutton directed the case to stand over, with liberty to apply.

Infants Missed by Lifeguards.—A child aged two made a dart across a road at Rotherham in front of a tramcar. The lifeguard dropped, but the child passed under the gate and was found dead on the side of the motor case. Mr. J. K. Parker, the Coroner, remarked that he had heard from officials of Sheffield and other tramway undertakings that this kind of lifeguard was what managers thought the best on the market, and was most widely fitted. He did not see how the jury could make any recommendation that was worth anything, because there was evidence that the Corporation had got the best.

Glasgow Traffic Items.—Owing to the inconvenience to the public and interruption by traffic generally consequent upon the tramway traffic being held up by processions through the streets, the Tramways Committee have made representations to the Magistrates Committee to the effect that, when sanctioning these processions, the magistrates define the routes. In reply to a question at the Council's May meeting, Councillor Montgomery, chairman of the Committee, said they could not grant special car facilities on Saturdays. The department were not building any new cars, the traffic was the largest on record, and in these circumstances all available cars were required for the ordinary traffic.

Economy in Power Consumption.—In order to induce passengers at Bradford to assist in the economical running of the cars they have been asked by the "Observer" of that city to give plenty of notice to the conductor when they wish to enter or alight. The cost of electricity required to run a car for an hour is about 1*s.* 2*d.* or 1*s.* 3*d.*, and the total cost of electricity for the tramways is about £50,000 a year. Some years ago there was a difference between the cost of running involved by particular drivers and others of from thirty-three to forty per cent. As the result of care bestowed on their training most of the drivers are within five per cent. of each other. Our contemporary remarks that five per cent. of £50,000 represents £2,500.

Engineers' Visit to Hull.—On May 13 a meeting of the Institution of Municipal and County Engineers was held at Hull, when the members were welcomed by the Lord Mayor (Alderman Hargreaves), who is chairman of the Tramways Committee. Mr. W. F. Bricknell read a paper descriptive of the Municipal works of Hull. Adverting to the tramways, he said the power-station was now equipped for a uniform three-minutes' service, with two 900 kw. sets and four 300 kw. sets. Steam was supplied by seven Lancashire boilers with mechanical stokers, superheaters, and economisers. The most recent overhead equipment was carried on span wires, and he regarded the centre standards, which were used at the outset, as "one of the few mistakes in the system." During the visits to places of interest the visitors inspected tramways with special ballasted tracks on Holderness Road and Hessle Road. The tramway power station and the electricity works were also visited. Among the appliances on view were a Week's tar-spraying apparatus mounted on Sentinel steam wagon, Green's motor sweepers, Whittome's "Rapid" sweeper and Whittome's "Royal" sweeper.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION

AND

MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,

AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 27.] LONDON, SATURDAY, MAY 27, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

DUBLIN CORPORATION ELECTRICITY SUPPLY.

CAST-IRON EXHAUST PIPES.

The Electricity Supply Committee of the Corporation of Dublin invite Estimates for the Supply, Delivery, and Erection of certain Cast-iron Exhaust Pipes and Supports for their 1,500-k.w. Belliss Engine.

Details of the work, as well as Specification and Tender Form, may be obtained from the "City Electrical Engineer," Pigeon House Fort Electricity Works, Dublin, on and after May 23, 1916, on payment of One Guinea, which will be returned on receipt of a bona-fide Tender.

Tenders, sealed and endorsed "Tender for Cast-iron Pipe Work," must be addressed to "The Chairman, Electricity Supply Committee, Lord Edward Street, Dublin," and delivered there not later than 12 noon on Tuesday, May 30, 1916.

The Committee do not bind themselves to accept the lowest or any Tender.

Electricity Supply Committee Offices, Lord Edward Street, Dublin. May 19, 1916. FRED J. ALLAN, Secretary.

CITY OF MANCHESTER.

ELECTRIC CAPSTAN.

The Electricity Committee of the Manchester Corporation are prepared to receive Tenders for the Supply and Delivery, at their Stuart Street Station, of an Electric Capstan.

Specification and Form of Tender may be had on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

Further particulars can be obtained on application to Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. Wednesday, June 7, 1916.

The firms entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any Tender.

Town Hall, Manchester. May 18, 1916. THOMAS HUDSON, Town Clerk.

MATLOCK URBAN DISTRICT COUNCIL.

TRAMWAY CABLE.

The above Council are prepared to receive Tenders for about 1967 Lineal Yards of Patent Steel Wire Tramway Cable, 3⅛in. in circumference, with Manilla Core, delivered at their Depot, Matlock, carriage paid.

Particulars, specifications, and terms as to payment, may be obtained from Mr. John D. Evans, Tramway Manager.

Tenders, to be accompanied by samples of wires, to be delivered at my office (marked "Cable") not later than 12 noon on Saturday, June 10, 1916.

The Council do not bind themselves to accept the lowest or any Tender.

Town Hall, Matlock, May 24, 1916. R. TAYLOR, Clerk to the Council.

BARKING TOWN URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

TENDERS FOR COAL.

The above Council invite Tenders for the Supply of Slack or Beans over periods of Six and Twelve Months.

Specification, Conditions of Contract and Form of Tender may be obtained from the Engineer and Manager, Electricity Works, Barking.

Tenders, endorsed "Tenders for Coal," may be delivered to the Chairman of the Electricity and Tramways Committee at 5 p.m. on Friday, June 9 next, or be sent by post, or delivered, to the Clerk to the Council so as to reach him before the date and time mentioned.

The Council do not bind themselves to accept the lowest or any Tender.

By order of the Council,
E. A. PRATT,
Acting Clerk.

Public Offices, Barking, Essex.
May 19, 1916.

POSITIONS VACANT.

COUNTY BOROUGH OF EASTBOURNE.

ELECTRICITY DEPARTMENT.

MAINS ENGINEER.

The Electricity Committee invite applications for the position of Mains Engineer at a salary of £156 per annum. The appointment will be permanent, subject to a month's notice on either side.

Applicants must have had a sound mechanical and electrical engineering training and must have had experience with a system employing single-phase high and low tension mains distribution.

Applications, written on foolscap, stating age, whether married or single, and giving full particulars of training and experience with dates in chronological order, accompanied by copies of not more than three recent testimonials and endorsed "Mains Engineer," to be sent by post only to the undersigned not later than 5 p.m. on Friday, June 9, 1916.

Electricity Works, Eastbourne. May 18, 1916. J. K. BRYDGES, Borough Electrical Engineer.

HOLYHEAD URBAN DISTRICT COUNCIL.

SHIFT ENGINEER.

Shift Engineer wanted, who is not eligible for enlistment. Preference given to one who has previous experience in a direct-current three-wire generating station, and is able to do jointing on three-core cables.

Apply, stating age (wages 32s. 6d. per week), with particulars of experience, and three copies of recent testimonials, not later than June 4th, 1916, to

Electricity Works, Holyhead. P. WILLIAMS.

MECHANICAL ENGINEER AND ELECTRICIAN.

Huddersfield Corporation require the services of a good Mechanical Engineer and Electrician. Ineligible for military service. For particulars of duties apply to "Borough Engineer."

SUB-STATION ATTENDANT.

Wanted at once, Sub-Station Attendant, one accustomed to Rotary Converters on E.H.T. supply preferred. Salary 35s. per week. Apply, stating age and full details of experience, with copies of recent testimonials, to the Chief Engineer, Electricity Works, Luton.

SECOND-HAND CARS.

Advertiser requires information of secondhand double deck or single deck cars (the former preferred) for sale. Reply, giving particulars of prices of cars, with spares available, including prices to contractor.—Box No. 38, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

Digitized by Google

FOREMAN OVERHEAD LINESMAN.

Foreman Overhead Linesman required; ineligible for service. Full particulars as to past experience, and wages required, to Engineer, Corporation Tramways, Portsmouth.

SHIFT ENGINEER.

Shift Engineer required; ineligible for service. Wages 40s. to 45s. per week, according to qualifications.

Applications with full particulars to Engineer, Corporation Tramways, Portsmouth.

SHIFT ENGINEER.

Shift Engineer required for small Traction and Lighting Station. Must be able to keep plant in running order. Applications, stating age, experience and wages required, to be sent to the Manager, Great Grimsby Street Tramways Company, Cleethorpes, Lincs.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS' SUPERFINE PAINTS
and
EXTRA DURABLE VARNISHES
for
TRAMCARS.

DOCKERS' "HERMATOR" PAINTS AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE

Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MAY 27, 1916.

PROGRESS IN TIME OF WAR.

Problems evolved by the war have not imposed a condition of stagnation upon managers, notwithstanding the shortage of men on the platform and in the workshop. We have recently described what is being done at Liverpool and Newcastle-on-Tyne as regards the production of cars that facilitate rapid loading and unloading; and since then particulars have been given of the ingenious means by which the Bradford Tramways department hope to improve goods transport in that city. Seven months ago, too, Leeds inaugurated the carriage of minerals on the tramways, and as such traffic has been fully provided for in the local Acts the Tramways Committee are considering a report by the manager on the prospects of utilising the tramways for goods traffic in districts situated a long distance from railway termini. The foregoing are indications that enterprise on the part of managers is likely to be supported by their committees. With a critical time to come in the form of a greater shortage of men through the operation of compulsory military service for married men up to forty-one years of age, there will be a still greater call upon the resource of managers. Cars operated by one man would not afford any great amount of relief now that women are available as conductors, but where single-deck cars of sufficiently small seating capacity are available an experiment might be made on lines where traffic is not heavy, or during the slack hours on others. A new car of this kind is creating great interest in the United States. It is 22 ft. 10 in. in length, has only one platform, is mounted on a Brill single truck, weighs under 10,000 pounds, and seats thirty persons. Two of these vehicles have proved so successful that an order has been placed for ten others. The car is spoken of as coming into the field at a most opportune time, when appreciation of the economic value of single-truck cars and the one-man method of operation seems to have become general. Further, it is stated that investigation has shown that the average load of a car during the fifteen hours of each day in many towns and districts does not rise above twenty passengers, hence the scope for this new car. All the leaving and entering passengers are directly under the observation of the motorman, thus guarding against accidents. At the rear is an emergency door, which is fastened by pneumatically and manually operated locks, the former being so arranged that in case of emergency it disengages the door, which then may be opened by the passengers. If the motorman takes his hand from the controller handle in any position in which the power is flowing to the motors, the current is cut off, the front door is opened, the rear door is unlocked, the brakes are applied and sand is released. Experiments with one-man cars in this country have not been numerous, and further effort might provide useful lessons in the adaptation of rolling-stock to various local needs.

TRAMWAY EMPLOYEES' CONFERENCE.

OPPOSITION TO WOMEN DRIVERS.—WOMEN CONDUCTORS' WAGES AT LEEDS.

At the annual conference of the Amalgamated Association of Tramway and Vehicle Workers, held at Sheffield, on May 23, a resolution was unanimously passed calling upon the Association to use their influence against the employment of women as tramcar drivers. The speakers contended that women engaged in such work would increase the danger to the public, and that the welfare of future generations would be endangered. It was urged by one speaker that the services should be reduced if men could not be obtained as motormen, and while some tramways committees were referred to as being determined to employ women as drivers, managers generally were described as being opposed to women on the front platform.

A resolution was passed declaring that the conditions of service of women conductors in Leeds and some other places was a serious menace to male labour, and that steps should be taken to obtain similar concessions to those of the men. A Leeds delegate stated that the local branch had failed to induce the Corporation to pay the women the same as the men, and that the former were receiving only 5½*d.* an hour.

Mr. N. Bradwell, a Sheffield motorman, was re-elected President with 8,305 votes to 7,781 recorded for a Salford candidate.

The conference decided to circulate among the branches the report of an interview with the Board of Trade relative to women drivers: the document hitherto had been treated as confidential. The President said the Board's only objective was to release men for the army, and if the Association relied on the Board of Trade it was relying on a broken reed.

It was resolved to support the Bradford and Leeds branches in their efforts to secure extra rates for Sunday and early cars for munition workers. Asked if this action would not put the employees in a better position than those in other towns, the President replied that Leeds and Bradford were the most backward towns in the North.

In an interview on the question of the pay of women conductors at Leeds, Mr. J. B. Hamilton, the general manager, has stated that their wages range from 27*s.* 6*d.* to 30*s.* per week. They were content with those wages, and there was a stream of hundreds of applicants for the jobs as they became vacant. The only possible justification that the men's union could have for their complaint was that the women conductors were not given an advance after six months' service, and that they did not receive a war bonus. Women conductors were started at the men's rate of 5½*d.* per hour, and at that wage they remained. They were only temporary employees; they were not so readily trained as men; and the cost of their clothing was nearly double that of the men.

HULL EMPLOYEES' FIXED HOURS OF WORK.

Alderman Hargreaves, Lord Mayor of Hull, in retiring from the chair of the Tramways Committee on May 24, reviewed the work of the Committee during the past three years. His lordship mentioned that the employees' hours of labour had been adjusted by a system that did not exist in any other city in the country. The men began duty at a certain time and knew exactly the hour at which their day's work was ended. Overtime could not be avoided, but it was overtime without compulsion, as volunteers had always been ready to come forward. During the three years the cost of car maintenance had been reduced by £12,000.

Half-penny stages had produced gratifying results, the income having increased from 8¾*d.* per car mile to 9½*d.* At the end of the last financial year the department had an actual profit of £12,469, of which £10,000 went in relief of the rates, and £2,469 passed to the reserve fund, which now stood at £142,000. This was all the more striking when it was remembered that the Committee were paying £4,078 annually in war bonus, and £8,759 per annum to men who had joined the forces. There was an increase in the coal bill of £1,997, and it should not be forgotten that soldiers were carried for nothing, this being estimated by the manager as equal to four million passengers. The population had been reduced in two years by enlistment from 291,118 to 269,530.

Digitized by Google

THE EMPLOYMENT OF WOMEN.

At Glasgow the number of women tramcar drivers on May 20 was 84, while the conductors numbered 1,200, as against 400 men. By the end of May all of the 500 male cleaners of cars will have been replaced by women. Well educated women have so successfully attended to switchboards in the power stations that they are being placed in charge of sub-stations.

To fill vacancies that will be caused by the calling up of the attested married conductors at Aberdeen, one hundred additional women are being trained as conductors. The department have decided not to employ women as drivers.

More than 100 women conductors are employed at Blackpool, but the Watch Committee have decided not to grant licences to women to act as car drivers. Several are receiving instruction on the cars of the Blackpool, St. Annes and Lytham Company.

The Lord Mayor of Hull on May 24 observed that despite of the opposition at the outset, none of the Tramways Committee would regret the employment of women as conductors. Without them the services could not have been continued. The Committee had kept faith with the men by refusing to increase the number of women, so long as men were available. Since March no women had been put on, while employment had been given to 45 men who had been discharged from the army.

Women are now employed as car cleaners at Sheffield at the men's rate of pay, viz., *7d.* per hour for a 45-hour week, the work being done at night. They are also receiving a war bonus of *2s.*, making a total payment of *28s. 3d.* Sir Wm. Clegg, chairman of the Tramways Committee, has stated that the women conductors received *6d.* per hour and a *2s.* war bonus. The manager had prepared statistics based on information given by the women entering their employment, and he found that their average wages before they entered the service of the department were only *12s. 11d.* per week, as compared with *29s. 6d.* In June a number would have completed twelve months' service, and would receive an additional *1s.* per week as merit pay for good conduct and good service, and in another six months they would be entitled to a further *1s.* per week. About 600 women were employed by the department, and were performing their duties very satisfactorily.

By 36 votes to five Salford Council have rejected a proposal made by Alderman Jackson to pay to all women employed upon the cars and in the sheds a war bonus equal to that paid to men performing similar duties. Alderman Linsley, chairman of the Tramways Committee, said the women were satisfied with their pay. A bonus would cost £1,400 a year. At Manchester the Tramways Committee were compelled to pay the bonus by the City Council, whose resolution applied to all employees irrespective of sex.

DEPRECIATION RATES AT GLASGOW.

Glasgow Corporation on May 11 considered a recommendation by the Tramways Committee that in making up the annual accounts of the department depreciation for the current year shall be at the following rates:—

Permanent way		£350	per mile.
Electric equipment of line	Average	2.9	per cent.
Ground		—	,,
Buildings and fixtures		2½	,,
Power station and sub-stations plant		5	,,
Workshop tools and sundry plant		5	,,
Cars	Average	8.2	,,
Electric equipment of cars		6	,,
Other rolling stock	Average	16.4	,,
Miscellaneous equipment		5	,,

Councillor Battersby moved that the recommendation that depreciation be at the same rates as last year be remitted back for further consideration. He contended it was true that the Corporation secured some of the money devoted to the depreciation fund. Treasurer M'Millan seconded. He said that in a time like this, when the Common Good had been depleted for the last two years, the Tramways Department, which was really part of the Common Good, should reconsider the depreciation rate.

Councillors McFarlane and Montgomery supported the recommendation, which was adopted by a large majority.

L.C.C. TRAMWAY MATTERS.

In addition to the business reported in our last issue the following reports were presented by the Highways Committee and were adopted:—

THROUGH RUNNING ARRANGEMENTS.

Since August 1, 1913, the receipts on the through running routes via Lea Bridge Road, have been pooled and divided between the Council and Leyton Urban Council according to the mileage run by each authority, the County Council being entitled to run mileage equivalent to the whole of the through mileage attributable to the London area, and 7½ per cent. of the total through mileage attributable to the Leyton area. This method of allocating receipts expired on December 7, 1915, and the Committee have agreed with the district council that it shall be continued for a further period of twelve months, and thereafter until terminated by six months' notice given by either party.

West Ham Corporation have given six months' notice to expire on October 5, 1916, to terminate the agreement dated December 16, 1910, between the Council, West Ham Corporation, East Ham Corporation, and Leyton Urban Council, for through running via Bow Bridge over certain tramways belonging to the authorities mentioned.

It has been decided to suspend until after the war the issue of the *9d.* return tickets between Waterloo Bridge and Northumberland Heath, Bexley, in connection with the through booking arrangements with Bexley Urban Council.

EFFECT OF THE WAR ON CONTRACTS.

The Stores and Contracts Committee reported soon after the outbreak of war that a large number of the Council's stores and general maintenance contracts, etc., had been affected, and indicated their policy for dealing with such contracts. During the past quarter they have continued the policy both as regards contracts entered into before the war and other contracts for stores, the supply of which has been affected by circumstances which could not be foreseen. In many cases the Committee have allowed contractors to charge increased prices, and they have made such allowance on condition that the firms will revert to the contract prices when called upon to do so. They have called the special attention of the respective committees to the serious difficulties that have arisen in obtaining supplies of stores required for the various services, and have pointed out that these difficulties are likely to increase. They suggest that the Committees should make special provision for those goods that are vital to the maintenance of important services.

MISCELLANEOUS NEWS AND NOTES.

Swansea Tramways Committee are applying for an extension of time for the construction of the tramways authorised in Carmarthen Road and Port Tennant Road.

Reduction of Assessment.—After four unsuccessful appeals the East London Railway Company have secured a reduction on rateable value from £5,092 to £100.

Sydney Electric Railway.—The construction of a tunnel under Macquarie Street for the city electric railway project has been begun by Messrs. Norton Griffiths, Ltd.

Increased Charge for Energy at Croydon.—A special war charge of ¾*d.* per unit on all units above ten millions has been levied on Croydon Tramways department by the Electricity Committee.

Suggested South Lancashire Extension.—In connection with the opening of new coal mines at Astley the South Lancashire Tramways Company have been asked to extend their tramways to the district.

Collision at Nottingham.—On May 20 a down car on the Sherwood Rise got beyond control, left the rails and dashed into an up car. A number of passengers were slightly injured, and one of the drivers sustained a fractured leg and was fixed so tightly against the staircase that he was not released until after half an hour's work.

War Distinctions for Leeds Employees.—At the end of the past financial year there were 473 employees of Leeds Tramways department on active service. Motorman J. Band has been awarded the D.C.M., and Inspector R. Dalby and Conductor W. Geldard have been mentioned in despatches. Ten men, including Inspector Dalby, have lost their lives.

Special Cars at Reading.—During the past year the Reading tramways department provided 54 cars free of charge for wounded soldiers. The number of special cars running daily is now eighteen. Some of these are used by school children, of whom 228,820 travelled last year—exclusive of those conveyed by special cars—as against 192,102 in the preceding year.

New Tramways.—A Bill has been introduced to enable the Guimarães municipality, Portugal, to borrow £70,000 for the construction of public works, including a tramway to Braga. Authority has been given by the Governor-in-Council, Victoria, to the Prahran and Malvern Tramways Trust to construct an electric tramway of 4-ft. 8½-in., from Kew to Malvern.

Boy's Trick on a Woman Conductor.—A boy of fourteen years is under remand at Doncaster on a charge of stealing *1s. 5d.*, belonging to the Corporation. The lad boarded a car and took the woman's cash bag, tickets and punch, telling her he was learning to conduct. On leaving the car he returned the things and said he was going to see Mr. Rayner, the manager. The woman informed an inspector.

Heavy Damages.—A Canadian soldier who was run over by a tramcar in Kennington Road at midnight on October 11, was awarded £500 damages against the London County Council, in the High Court on May 18. Contributory negligence on the part of the soldier was urged, and it was also stated that owing to the darkness the driver did not see him until within three yards of him.

No German Coaches for Buenos Ayres.—Owing to the war the Buenos Ayres Western Railway directors were unable to obtain the coaches they had ordered from Germany for the electric service between Once and Moreno. British manufacturers had to decline the business owing to war work, and the coaches are now being constructed in the railway company's shops with the assistance of the Great Southern Railway.

Sheffield Tramways Power Station.—The Local Government Board have introduced a Bill to confirm a Provisional Order granted by the Board to Sheffield Corporation, providing that Kelham Island power station, with the plant, cables, tunnel, etc., used for generating power for the tramways, shall in future cease to be part of the tramway undertaking, and shall be deemed to be part of the electrical undertaking.

The Increased Workmen's Fares at Newcastle.—May 21 was the date when the increased fares for workmen came into force on the Corporation cars. The increase is threepence in the shilling and eighteenpence books, and twopence on the sixpenny books. Special offices have been opened for some time for the sale of the coupons, which have been purchased in large quantities. All workmen and workwomen who do not tender coupon tickets have to pay the full ordinary fare. With this regulation, all cars hitherto labelled "workmen's car" will be abolished.

Digitized by Google

etrograd Tramway Difficulties.—The Petrograd tramways are fo in in difficulties for fuel. With only enough petroleum on hand of sixteen days the management have notified a probable reduction service. The electric station consumes 250,000 poods of Petroleum per month. A report in the "Retch" hints at a complete stoppage of the tramways as possible. The number of cars has now increased to 680; over 200 repaired wagons have just been issued from the repairing shops. Besides these, ten new cars arrived unexpectedly, out of twenty that have been waiting in the Kolomensk factory for nearly a year.

Prospective Business in Australia.—The Fitzroy, Northcote, and Preston (Victoria) Tramways Trust are sending representatives to India to obtain information as to the running of petrol motor rail cars. A proposal is before the Eastern Northcote (Victoria) Council to construct a tramway at a cost of £20,300. The ratepayers of Port Adelaide have approved of the Council borrowing £12,000 for the construction of an electric tramway. A suggestion for the erection of a bridge at the Spit, over Sydney middle harbour, for tramways and general traffic, is under the consideration of the New South Wales Minister for Works. The estimated cost is £43,000.

Interesting Prosecution at Wigan.—Two men of the local Volunteer Corps were summoned at Wigan for refusing to pay their fares on a Corporation tramcar. Defendants claimed the right to share in the privilege of travelling at half fares, which had been granted to soldiers. For the Corporation it was maintained that the concession applied only to regular soldiers. Defendants' reply was that on April 9 Volunteer Corps all over the Kingdom were recognised as part of His Majesty's Forces. The Bench dismissed the summonses, expressing a hope that an amicable arrangement would be arrived at by the Tramways Committee, and refused to state a case for appeal.

Summonses Against Glasgow Vehicle Drivers.—Nearly forty drivers were fined 5s. each at Glasgow during the week ended May 20, for failing to observe the new traffic by-law. The previous by-law, which is superseded by the new regulation, referred only to streets where tramways had been laid down, and under it obstruction had to be proved. Under the new order it is an offence for slow-going vehicles to take the centre of any street, whether the road is clear or not, unless there is sufficient reason for doing so. The Tramways Department intend to bring all contraventions before the notice of the magistrates, and it is understood that proceedings have been instituted against nearly four hundred carters.

Cost of Permanent Way Maintenance in York.—A report presented by the Committee on Employment and Expenditure, who have investigated the work of the various departments of the Corporation, shows that for the tramways permanent way the average cost in seventy-one other towns per mile for maintenance is £168, and per car mile .52*d*. In York the cost per mile for maintenance is £30 and .12*d*. per car mile. The low figure for York is accounted for to some extent by the greater age of the tramways in other towns. The cost of road maintenance in York is £149 per mile, or 2*s*. 9*d*. per head of population, against an average of £162 and 3*s*. 7*d*. per head in thirty-four similar towns.

Unreliable German Turbo-Alternators.—In his annual report Mr. T. H. Aldridge, engineer-in-chief to Shanghai Municipal Council, records that the turbo-alternators of German manufacture that were installed two years ago at Riverside generating station have proved most unreliable. Two 2,000 kw. machines supplied by the A.E.G. of Berlin, which have been running less than two years have cost respectively £318 and £267 per annum for repairs, as against £40 each per annum for six British turbo-alternators that were purchased from five to nine years ago. The German machinery was offered at a low price and with guarantees of efficiency. Mr. Aldridge observes that troubles with machines of similar make have since come to light in Australia and England.

Special Constables' Fares.—Councillor G. New, chairman of Sunderland Tramways Committee, made some outspoken remarks in opposing the Watch Committee's request that special constables should be allowed to travel on the tramcars free of charge when going on or coming off duty. He said that in private life it was looked upon as dishonest and unfair, and a man was regarded as contemptible who tried to shift his responsibilities and burdens to the shoulders of others. If ordinary members of the police force travelled free, it was not because the Committee approved of it. The tramways were a business undertaking, and the object of the Committee was to work them for the benefit of the town. If patrol men were to be carried free, why not the whole of the special constables? The present proposal only intensified the evil in regard to regular constables. As reported in our last issue, the Council adopted an amendment that the cost be borne by the Watch Committee.

Tramways and Light Railways Congress.—Friday, June 30, has been definitely fixed as the date for the annual congress of the Tramways and Light Railways Association. The annual meeting will be held at 2.30 p.m. at the Westminster Palace Hotel, after which Mr. W. T. Robson, general manager of the Southampton Corporation Tramways, will read a paper entitled "Tramway Transit and Comfort; a Plea for the Passenger." After the discussion the members will be conveyed to the London General Omnibus Company's training school at Milman Street, Chelsea, where they will be received by the operating manager, Mr. H. E. Blain. After an inspection, etc., Mr. Blain will give an address on "The Safety Movement." At the annual dinner, to be held at 7.30 p.m. at the Trocadero Restaurant, the Hon. Arthur Stanley, M.P., will preside. Members are asked to notify the secretary at an early date how many tickets they will require for themselves and friends. Evening dress will be optional.

Maintenance During Shortage of Materials.—In his annual report, Mr. J. H. Cowell, general manager Blackburn Corporation Tramways, states that general repairs and maintenance had been well attended to, and the cars were in a high state of efficiency. Four miles of trolley wire had been renewed, another portion should be renewed during next year, but as the wire could not be purchased at the present time, he had had this portion anchored so that there would be less danger of accident in case of breakage. By this means the Committee would be able to defer renewal to another year. Renewals and repairs to the permanent way had been carried out where necessary. Another portion of the permanent way should be renewed during the coming year, but owing to the difficulty of obtaining rails, he thought it wise to leave it over for the present time. With a view to this, during the past year he had had renewed the really dangerous sections of the routes, so that the portions held over for renewing occur on the straight and not on inclines or curves. There are 119 employees serving with the forces.

Collapsible Hood for Omnibuses.—A new illustrated catalogue of the Beck patent collapsible hood for motor omnibuses and other vehicles has been issued by the Willesden Paper and Canvas Works, Ltd. A feature of the publication is that it reveals the simple and effective manner in which Mr. F. Beck, the patentee and manufacturer of the hood, has met our objection that the hood, when lowered, obstructed the front destination board. This drawback has been overcome by advancing the front board and moving the front seat on either side four inches towards the centre. The space thus provided at the sides accommodates the hinges of the framework, while the hood, when collapsed, rests between the advertisement board and the front barrier of the top deck. When closed the hood is thus entirely hidden from view. Another advantage is that the alteration gives additional space for advertisements upon what is the most prominent portion of the vehicle, namely, the side space immediately over the driver's canopy. Mr. Beck is deserving of congratulation upon the perseverance he has shown in perfecting an appliance that will have the effect of increasing the earnings of omnibuses, etc., in wet weather.

Transit and Town Planning.—At the Surveyors' Institution a paper was read by Mr. W. R. Davidge on "The Principles and Position of Town Planning," in the course of which he said that the provision of efficient and up-to-date means of transit was one of the most important items in the development of towns, yet strangely enough this essential detail was omitted from the calculations of many town-planners. He referred to Mr McElroy's report on the "Passenger Transportation Problem," to the Manchester Corporation, which he said was an excellent summary of what so far has been achieved in America and in the principal continental cities. In the course of the debate, Colonel R. C. Hellard, R.E., C.B. (superintendent of the London Traffic Branch of the Board of Trade) stated that his Branch would be closed after June 30 next. The work of future road improvements would now be left in the hands of the district conferences, which had already agreed to so many points that he thought they might hope for some improvement being carried out in the course of time.

Why Dundee is Without Women Conductors.—Replying to a suggestion made by a local correspondent that women should be engaged as conductors at Dundee, Mr. Peter Fisher, general manager of the Corporation Tramways, has stated that he knows of no tramways where women were employed so long as men were to be obtained, and there was not in every centre a supply of women available without taking them from other industries more indispensable than tramways. Women had been brought to Dundee from four other towns to be trained to work at local factories; thus it would appear that there was a shortage at Dundee. On the other hand there was a plentiful supply of discharged soldiers, and these men were being employed as conductors. In pleading for a more sympathetic attitude from the public towards these men, who were often put upon the cars after three days' training, Mr. Fisher says that many of them left the employment for the sole reason that they could not stand what was being said about them publicly —Great Yarmouth Tramways Committee having considered the question of the employment of women conductors, have decided to seek suitable men ineligible for military service.—Stirling and Bridge of Allan Tramways Company have recently begun to employ women conductors.

PERSONAL.

Mr. Edgar Allen, steel manufacturer, left £32,000 to Sheffield University for the provision of scholarships, half of them to go to the sons of working men.

Mr. A. C. L. Fell, chief officer of London County Council Tramways, is, we are glad to state, making satisfactory progress after his serious illness. It is hoped that he will be able to resume duty in a few weeks' time.

Alderman J. H. Hargreaves, Lord Mayor of Hull, having accepted the chairmanship of the Parliamentary Committee of the City Council, under a new by-law of the Corporation, has had to retire from the chair of the Tramways Committee. Councillor W. Wheatley was unanimously elected chairman of the Tramways Committee on May 24, and Councillor Hakes was appointed deputy-chairman.

Lieutenant Ben Fry, who for about three years prior to the war was purchasing agent for the Buenos Aires Lacroze Tramways and the Buenos Aires Central Railway, has been for the past sixteen months serving in the Army Ordnance Department. He was first posted to Tidworth, and then obtained a transfer to Devonport, where he remained until February last, when he received instructions to proceed to Liverpool. Lieut. Fry is now attached to the Railway Transport and Embarkation staff, which appointment is affording him an excellent opportunity of seeing the practical working of the railway at the port. We understand that Lieut. Fry is shortly to be married in London, and he will have the cordial good wishes of many friends for his future happiness and success.

Digitized by Google

CONTRACTS AND ORDERS.

London County Council have placed contracts with the British Westinghouse Company for the supply of traction glow lamps.

Nelson Tramways Committee have decided to have five additional trucks fitted with new car bodies by the United Electric Car Co., of Preston.

Southend Light Railways Committee have placed orders with Mr. D. B. Rose for cars, and with Messrs. R. W. Blackwell for strainers, wire bolts and mechanical frog for new overhead equipment on the Leigh route.

FINANCIAL REPORTS AND MEETINGS.

Birkenhead Corporation Tramways.—This undertaking has had a successful year, and £4,000 is the estimated amount to be given in aid of the rates.

Cape Town Consolidated Tramways and Land Company.—The accounts for 1915 show an adverse balance of £816, against £1,894 for the previous year. No dividends have been declared by any of the subsidiary companies.

Metropolitan Carriage, Wagon, and Finance Company.—The directors recommend a final dividend on the ordinary shares at the rate of twelve and one half per cent., making ten per cent. for the past year, and a bonus of five per cent.

Leicester Corporation Traffic Receipts.—We have been officially notified that the Tramways Committee have discontinued the publication of the weekly traffic receipts, as they consider the figures at the present time to be misleading, owing to the large increase in expenses.

L.C.C. Tramway Receipts.—The tramway receipts from April 1 to May 3 (four and a half weeks) were £222,743, a decrease of £10,033 as compared with the corresponding period of last year. For the four weeks ended May 3 the number of passengers carried was 44,552,833, a decrease of 1,341,304 as compared with the corresponding period of 1915, while the receipts were £189,183, a decrease of £5,721. The route mileage was 141.67 miles.

Lima Light, Power and Tramways Company.—The net profit during 1915 was £p.101,318.536, which, with balance brought forward, £p.50,077.967, makes £p.151,396.503. This the directors have divided as follows:—To reserve and redemption fund, £p.29,000; to reserve for bad and doubtful debts, £p.13,000; to amount written off value of shares owned by Empresas Eléctricas Asociadas in other Companies, £p.29,000; leaving £p.80,396.503 to be carried forward.

Dublin United Tramways.—Our list of Tramway and Omnibus Traffic Returns for the week ended May 19, records the gratifying fact that the receipts of the Dublin United Tramways Company have again become normal. There was, in fact, an increase of £79 19*s.* 5*d.* over the corresponding week of last year. For the previous week the total receipts amounted to £4,185 15*s.* 3*d.*, a decrease of £1,848 16*s.* 4*d.* The effect of the insurrection on the traffic receipts is shown by the total decrease of £8,686 for the twenty weeks of this year.

Electric Construction Company.—The net profits for the year ended March 31, after providing for debenture interest and £7,500 for depreciation, were £43,241, and £7,471 was brought forward. A dividend of seven and one half per cent. is proposed on the ordinary shares, adding to the reserve (which will then stand at £50,000), £12,664, and carrying forward £16,839. The unexecuted orders at the beginning of the new financial year exceeded those on hand a year ago. The company's works are a controlled establishment under the Munitions of War Act.

Callender's Cable and Construction Company.—The profits for 1915 were £113,267, and £163,169 was brought forward. A dividend of 10*s.*, a bonus of 5*s.*, and a special bonus of 5*s.* per share (together twenty per cent.) are proposed on the ordinary shares, carrying forward £207,347. For many previous years the distribution on the ordinary shares was at the rate of fifteen per cent. per annum. The company was declared a controlled establishment on Aug. 18, 1915, and the shareholders are assured, in the annual report, that no firm in the electrical industry has rendered more service to the nation than this company. A large number of women have taken the places of men who have joined the forces.

Anglo-Argentine Tramways.—The report of the Anglo-Argentine Tramways for 1915 makes a disappointing showing. It states that the gross receipts amounted to £2,709,615, less working expenses (which include various items amounting in the aggregate to £120,000 carried to the depreciation renewals reserve in addition to £265,692 expended on ordinary maintenance) £1,786,740, leaving £922,875, which, with interest on investments and deposits, £45,403, transfer fees, etc., £233, and the amount brought forward, £96,408, makes £1,064,921. Interest and charges absorb £970,801, leaving balance of net revenue account, £94,120. The receipts show a decrease of £141,380, and the expenditure has been reduced by £94,256, and now probably represents the minimum compatible with efficiency, while the position is aggravated by the continuous rise in the price of fuel, upon which the price paid for electric current is based. In these circumstances, and having regard to the difficulty of forecasting the results of the present year, the directors were unable to recommend the payment of a dividend on the ordinary shares. The balance at the credit of profit and loss, £94,120, has accordingly been carried forward.

Heavy Loads and Less Mileage at Birmingham.—A report on the working of the Birmingham Corporation Tramways during the year ended March 31 last was presented to the Tramways Committee on May 15. The traffic revenue increased by about £125,000, and the number of passengers by fourteen millions, the total being 163 millions, as against 149 millions. The number of miles run was 14,151,000, as against 14,232,000. Therefore the cars were more heavily loaded, the department, owing to shortage in staff, being unable to put on extra cars. The working expenses per car mile increased considerably, chiefly owing to the amount given to dependents of employees who are now with the colours. This sum amounted to £37,600, as compared with £17,000 the previous year.

Swansea Improvements and Tramways Company.—The revenue for the past year amounted to £65,085, being a decrease of £1,631. The traffic receipts amounted to £63,088, showing a decrease of £2,047. After deducting all expenses chargeable to revenue, including debenture and other interest, and the amount payable to Swansea Corporation in respect of the tramways and light railways leased from them (including £517 16*s.*, being two per cent. on the gross profits for the year), and after setting aside the sum of £4,000 for renewals, there remains a surplus of £12,982. The addition of the sum of £2,831 brought forward, brings the available balance up to £15,813. This is allocated as follows:—£3,000 to reserve, £590 dividend on six per cent. preference shares; £7,800 dividend on ordinary shares (making six per cent. for the year), and £2,415 as the carry-forward. The expenditure on capital account was £866.

Bradford Corporation Tramways.—The city treasurer on May 15 presented the annual statement of accounts relating to the working of the tramways in 1915-16. The traffic income amounted to £314,500, an increase of £9,500, and working out at 12.8*d.* per car mile, against 11.8*d.* The traffic portion of the working expenses amounted to £88,000, against £87,100, or 3.6*d.* per car mile, against 3.40*d.* The direct contribution to rates amounted to £15,700, an increase of £500; and in addition £25,000 was appropriated from tramway reserves in relief of rates, making a total contribution of over £40,000. Repairs and maintenance of permanent way and cars cost over £5,000 less, but in allowances to dependents of employees £8,338 had been paid, being £5,554 more. For the trackless system the income was £8,780, representing 6½*d.* per car mile, as compared with 5¾*d.* in the previous year. The expenditure, inclusive of interest and sinking fund, amounted to £10,711, slightly less than 8*d.* per car mile, as compared with 8¼*d.* the previous year. The car mileage run on the general tramways was 5,877,000, being 317,000 less; on the railless system it was 322,000, an increase of 145,000. This increase was largely accounted for by new routes having been opened. The net profit for the whole undertaking was £29,700. The committee expressed gratification at this result and appreciation of the good work done by the management and all branches of the service. There was a diminution of £5,000 for maintenance expenditure on permanent way and cars, and renewals cost only £6,000 as compared with an average annual expenditure of between £20,000 and £25,000. A substantial deduction should be made, therefore, from the year's profits because it had been impracticable to carry out work to keep the system in its usual high state of repair, work which must be undertaken when the present difficulties with regard to labour and material disappear.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended May 13, the latest period for which full returns are available, give total receipts of £179,992, or £7,030 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £76 4*s.* per mile of single track, and last year at the rate of £75 9*s.* 11*d.*, thus showing an increase for the week of 14*s.* 1*d.* per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. May 25.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	69¾	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	68/9	70
4%	4%	Do. 4% Deb. ...	100	91	75	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	75
5%	5%	Do. 5% Deb. ...	100	96	79	78½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	18/3xd	18/6xd
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	95½	95½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10¼	10¼
4½%	4½%	Do. 4½% Deb....	100	96	85	85
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$½	$1	Brazilian Trac. & Power Ord....	$100	66	63½	58½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	93½	93⅛
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅞	6 13/16
2/6	2/6	Do. 5% Cum. Pref. ...	5	5	89/-	89/4½
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	38½	38
6%	5%	Do. Pref. Ord....	100	106	40½	39¾
5%	5%	Do. 5% Cum. Pref.	100	103	57¾	55
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	81
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	61⅞	62
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	74	72½
70/-	70/-*	Do. 7% Pref.	100	55½	46¾	46¾
—	—	Do. 6% Pref. Ord.	100	17½	16¾	16¾
—	—	Do. Def. Ord.	100	11	10	9½
5%	5%	Do. 5% Deb.	100	92	78½	78
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	67¾	68
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6xd	5 13/32xd
1/3	1/3	City of B.A. Trams.	5	5½	91/6xd	91/6xd
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	88¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11	11
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	¾	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1⅝d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/4½	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	9/-	9/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	89⅞
5%	5%	Do. 5% Inc. Deb.	100	88½	79	80
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48	48
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾xd	103¾xd
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	72	70½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½	80½
$1¾	$1¾	Mexico Trams. Common ...	$100	70	26	26
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43	43
6%	6%	Do. 6% Mt. Bds.	100	76	35	35
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94	94
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92	92
1/2*	1/2**	National Steam Car	1	15/32	15/-	16/-
9⅜d.*	9⅜d.*	New General Traction	1	¼	7/9	7/9
6d.	8⅜d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	55/-	55/-
5%	5%	Do. 5% 1st Deb.	100	89½	72xd	75xd
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/7½	10/7½
8d.	10d.	Provincial Trams. Ord.	1	¾	17/3	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	90¾	90¼
5%	5%	1st. Mt. 5% 50 yr.	100	89½	79	75¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	77½
—	—	Singapore Elec. Trams	5/-	¾	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	93¾	93¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	91¾	91¾
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	74	73
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	1915-16	Aggregate. Wks.	1915-16	Increase or Dec.
Anglo-Argentine	May 20	£53,193	£52,485	21	£1,028,646	+ £129
Auckland.....(28 days)	Apr. 7	20,216	20,767	40	210,704	+ 3,553
Ballarat and Bendigo ...	Mar. 26	3,548	3,881	52	43,724	— 2,385
Brazilian Traction Mlrs.	Mar.	6 294 910	6,711,000	13	19,220,000	+1,131,400
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia.....$	Mar.	557,135	577,117	39	4,982,147	— 772,894
Buenos Aires Lacroze ...	Apr. 10	41,765	40,220	43	413,102	— 8,139
Burmah Tramway ... Rs.	May 20	3,827	3,859	42	...	+ 7,640
Calcutta.....Rs.	,, 20	65 031	65,765	21	1,353,219	+ 83,634
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	Apr.	1,496	2,513	18	9,930	+ 3,272
Cordoba	Mar.	12,746	13,598	52	161,906	+ 6,251
East India	Apr.	1,864	2,116	39	18,706	+ 1,466
Hong Kong .....$	Apr. 22	10,198	15,946	19	215 089	+ 33,012
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon .....Escu.	Mar.	...	175,706	13	522,600	...
Madras (2 weeks).....Rs.	May 15	29,026	30,154	19	281,624	+ 24,537
Manila .....$	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Mexico .....$	*	...	...	...	...	...
Montevideo	Apr.	26,786	28,997	26	187,419	+ 12,764
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Apr.	4,964	4,849	18	19,787	— 74
Shanghai .....$	Apr. 26	23,284	25,305	...	...	...
Singapore .....$	Apr. 15	11,572	13,211	15	184,326	+ 22,780
Toronto.....$	Mar.	820,750	910,969	13	2,663,575	+ 232,148
Winnipeg	Mar.	303,209	296,500	13	887,310	— 81,239

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Aggregate. Wks.	1916	Incr. or Dec.
Aberdare	May 16	£316	£346	+ £30	7	£2,516	+ £177
Aberdeen Corporation...	,, 17	1,613	1,740	+ 127	50	89,018	+ 5,628
Accrington Corp.....	,, 10	542	549	+ 7	6	3,397	+ 123
Ayr Corporation	,, 20	333	326	— 7	1	256	— 77
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	,, 21	1,368	1,516	+ 148	7½	10,644	+ 748
Birmingham Corp.	,, 20	12,996	16,362	+ 3,365	7	116,426	+ 20,386
Do. Motor Omnibuses	,, 20	774	971	+ 197	7	6,398	+ 823
Blackburn Corp.	,, 17	1,240	1,166	— 74	7½	9,543	+ 62
Blackpool & Fleetwood.	,, 22	416	478	+ 62	20	8,246	+ 949
Blackpool Corp.	,, 18	699	844	+ 145	7	9,416	+ 2,507
Bolton Corporation.....	,, 21	1,711	2,934	+ 1,223	8	21,281	+ 1,718
Bournemouth Corp.....	,, 24	2,648	2,264	— 384	8	17,372	— 160
Bradford Corporation ...	,, 20	6,346	7,015	+ 669	7	49,017	+ 543
Brighton Corporation ...	,, 21	1,067	1,191	+ 124	7¾	8,117	+ 546
Bristol	,, 19	9,912	9,958	+ 46	20	186,884	+ 10,264
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 20	1,525	1,677	+ 152	8	13,841	+ 1,282
Burton-on-Trent Corp...	,, 21	286	265	— 21	7	1,852	— 199
Bury Corporation.....	,, 21	1,328	1,498	+ 170	7¾	10,641	+ 330
Cardiff Corporation.....	,, 13	2,625	2,764	+ 139	6	16,668	+ 983
Chatham & District.....	,, 18	1,129	1,240	+ 111	20	21,839	+ 1,211
Chesterfield Corp.	,, 11	250	257	+ 7	6	1,671	+ 115
Colne Corporation	,, 13	241	259	+ 18	...	...	...
Cork Electric	,, 18	497	516	+ 19	20	9,146	— 90
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	May 20	1,046	1,156	+ 110	7½	8,052	+ 411
Dover Corporation	,, 20	301	315	+ 14	8	2,160	+ 8
Dublin & Lucan	,, 19	139	144	+ 5	20	2,356	— 259
Dublin United	,, 19	5,867	5,947	+ 80	20	106,142	— 8,567
Dundee City	,, 17	1,317	1,279	— 38	52	70,455	+ 3,902
East Ham Corporation	,, 20	1,221	1,311	+ 90	7½	9,221	— 219
Exeter Corporation.....	,, 19	354	375	+ 21	7	2,593	+ 34
Glasgow Corporation	,, 20	22,814	23,355	+ 541	51	1,112,076	+ 78,070
Glasgow Subway.....	,, 20	1,065	1,139	+ 73	20	24,616	+ 2,783
Glossop (U. Elec. Supp.)	,, 20	126	140	+ 14	21	2,765	+ 386
Halifax Corporation.....	,, 16	2,083	2,072	— 11	6¼	14,772	+ 33
Do. Motor Omnibuses	,, 16	47	42	— 5	6¼	293	— 45
Hastings & District.....	,, 19	864	974	+ 110	20	16,236	+ 453
Huddersfield Corp.	,, 20	2,525	2,896	+ 371	7	20,694	+ 2,461
Hull Corporation	,, 20	3,082	3,131	+ 49	7	21,899	— 815
Ilford U.D.C.	,, 20	632	691	+ 59	7	4,944	+ 461
Ilkeston Corporation ...	,, 25	124	144	+ 20	8	1,057	+ 39
Ipswich Corporation	,, 20	512	511	— 1	7	3,440	+ 280
Isle of Thanet	,, 20	457	340	— 117	33	8,756	— 1,415
Kilmarnock Corp.	,, 20	170	122	— 48	1	122	— 48
Lanarkshire	,, 18	2,001	2,184	+ 183	20	43,020	+ 7,103
Lancashire United	,, 17	1,703	1,696	— 7	20	33,015	+ 1,806
Leeds City.....	,, 22	8,736	9,772	+ 1,036	8	69,365	+ 8,107
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 20	577	627	+ 50	5	627	+ 50
Leyton U.D.C.....	,, 18	1,683	1,553	— 130	7	11,181	— 329
Liverpool Corporation...	,, 20	13,402	14,125	+ 723	20½	270,115	+ 13,823
Llandudno & Colwyn B.	,, 19	317	294	— 23	24½	5,450	— 226
London County Council	,, 3	50,155	46,931	— 3,224	4½	222,743	— 10,033
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	,, 20	160	132	— 28	32½	4,231	— 1,220
Maidstone Corporation..	,, 18	197	206	+ 9	7	1,562	+ 10
Manchester Corp.....	,, 20	17,759	18,559	+ 800	7	132,715	+ 7,628
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	Apr. 22	169	269	+ 100	3½	737	+ 62
N'castle-on-Tyne Corp.	May 20	6,322	6,488	+ 166	7	44,031	+ 968
Newport (Mon.) Corp....	,, 20	835	944	+ 109	7	6,502	+ 1,317
New St. Helens & Dist.	,, 17	895	902	+ 7	46	45,639	+ 3,341
Northampton Corp.....	,, 19	731	680	— 51	7	4,859	— 331
Nottingham Corp.....	,, 18	3,454	3,777	+ 323	7	26,186	+ 1,070
Oldham Corporation ...	,, 21	2,387	2,615	+ 228	8	20,519	+ 1,236
Portsmouth Corp.....	,, 20	2,474	2,678	+ 204	8	19,023	...
Preston Corporation.....	,, 17	898	1,044	+ 146	6¾	7,113	+ 680
Provincial	,, 23	2,182	2,397	+ 215	33	69,706	+ 4,514
Reading Corporation.....	,, 18	748	794	+ 46	6¾	5,530	+ 426
Rhondda Tramways.....	,, 3	1,169	1,258	+ 89	18	21,372	+ 1,248
Rochdale Corporation...	,, 20	1,682	1,747	+ 65	7½	13,161	+ 574
Rotherham Corp.....	,, 24	1,483	1,434	— 49	7¾	10,782	+ 2,203
Salford Corporation.....	,, 22	5,510	5,758	+ 248	7¾	40,261	+ 2,575
Sheffield Corporation....	,, 21	8,650	10,672	+ 2,022	8	82,268	+ 14,251
Southampton Corp.....	,, 17	1,409	1,491	+ 82	6¾	10,289	+ 590
Southend-on-Sea Corp...	,, 17	759	705	— 54	7	5,127	— 559
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	,, 18	735	735	nil	6½	4,818	+ 258
Sunderland Corp.....	,, 21	1,460	1,612	+ 152	7	11,202	+ 443
Sunderland District.....	,, 17	559	541	— 18	29	16,532	+ 1,009
Swindon Corporation ...	,, 17	192	189	— 3	6¾	1,315	+ 53
Torquay Tramways.....	,, 11	581	518	— 64	19	8,737	— 16
Tyneside Trys. & Tmrds.	,, 17	613	546	— 67	20	10,130	— 428
Wallasey Corporation ...	,, 20	1,220	1,301	+ 81	7½	9,359	+ 446
Walsall Corporation.....	,, 20	717	813	+ 96	21	15,952	+ 2,211
Walthamstow U.D.C....	,, 20	842	1,067	+ 225	7	7,489	+ 1,373
Warrington Corp.....	Apr. 27	420	525	+ 105	4	1,911	+ 245
West Ham Corporation	May 18	2,932	3,191	+ 259	6¾	22,115	+ 934
Wigan Corporation	,, 18	1,583	1,616	+ 33	7	11,353	+ 612
Wolverhampton Corp....	,, 24	1,580	1,241	— 339	8	9,393	+ 653
Yorkshire (W. Riding)...	,, 21	1,583	1,736	+ 153	21	34,851	+ 3,639

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

The Croydon Strike. - At their meeting on May 15 Croydon Corporation, by 27 votes to 23, rejected a motion that on the strikers returning to work the Tramways Committee be requested to meet a deputation of four ex-employees and an outsider to discuss any grievances that they might wish to put forward with a view to consider what, if any, adjustments the Committee could recommend to the Council. At the same meeting the Committee presented a report, prepared by their chairman and the general manager, as to wages and conditions of service. It was therein stated that the Committee had under consideration the conditions of service of the employees and the present fares and tramway services, and proposed to report thereon when presenting the annual accounts to the Corporation. Reference was also made to the fact that the weekly additions asked for by the union amounted to 15*s.* 7*d.* and 11*s.* 7*d.* for motormen and conductors respectively. This week 126 men and 10 women, who had been summoned for failing to deliver up their uniforms, returned the clothing, and a few of them made application for reinstatement. They were taken on at the old rate of pay for the duration of the war. As many as fifty cars are now in service. The Committee, Mr. T. B. Goodyer, the general manager, and the staff deserve the thanks of the Corporation and the travelling public for the arduous work that they have performed in keeping the services going.

PERSONAL.

Sir Hiram Maxim has accepted the invitation of the Aeronautical Institute to become their first President.

Mr. G. H. Browne has been appointed engineer and manager to the Mexborough and Swinton Tramways Company.

Sir C. A. Parsons is a member of the Committee appointed to inquire into the administration and command of the Air Service.

Mr. L. C. F. Bellamy, manager and electrical engineer, Ilkeston Corporation Tramways, is still on active service at the front as a lieutenant in the Royal Engineers.

Mr. A. O. Kolkhurst, general manager, Lisbon Tramways Co., and the entire staff, received the appreciation of the directors in the annual report for their services during the past year.

Mr. G. G. Hazard, London representative of Siemens Brothers' Dynamo Works, Ltd., Upper Thames St., E.C., has been appointed to the motor transport of the Army Service Corps, as from May 8.

Lieutenant Mulliner, assistant borough electrical engineer, Eccles, has been invalided from France owing to nervous breakdown. After a sojourn in hospital at Hampstead, he has gone to his home at Malvern.

Mr. G. F. Craven, general manager and electrical engineer, Reading Corporation Tramways, has been recommended for an increase of £50 a year in his salary of £550, to date from April 1 last, instead of January 1 next.

Sir Charles Rivers-Wilson, Finance Minister in Egypt 1878–79, British Representative on the Suez Canal Board 1879–95, former President of the Grand Trunk Railway, and Chairman of the British Electric Traction Company, who died on February 9 last, aged 84, left unsettled estate £10,091 gross and £8,528 net.

Mr. C. W. Salt, borough electrical engineer of Torquay, who enlisted in the London Electrical unit of the Royal Engineers and was recently given a commission therein, has been congratulated on his promotion by the Torquay Corporation. During his absence his duties are being performed by Mr. J. M. Keenan, who has recently been granted a war bonus of five guineas per month.

Mr. J. H. Cowell, general manager, Blackburn Corporation Tramways, was warmly commended by Councillor C. Higham, vice-chairman of the Tramways Committee, in referring at the Council's May meeting to the working of the undertaking during the past year. Nowhere in the country, said the vice-chairman, were the cars and their upkeep better looked after, and the time was not far distant when the undertaking would stand free from debt.

Alderman F. Arnold, who died suddenly at Great Yarmouth on May 12, was for several years chairman of the Tramways Committee. Mr. Arnold was the foremost advocate of the introduction of the tramways to the town, and he displayed great interest in the work of the Committee and the welfare of the employees.

CONTRACTS AND ORDERS.

Southampton Tramways Committee have placed an order for an Edison battery automatic tip-wagon, at £950.

Glasgow Tramways Committee have placed a contract with the Dunlop Rubber Company for the supply of solid rubber tires for the motor omnibuses, at 0.875*d.* per vehicle mile.

Victorian Railways Department have accepted the tender of Noyes Bros. for Ackley hand brakes at £8 5*s.* each for new bogie cars for the St. Kilda-Brighton electric railway, and of the Australian General Electric Company for material for railway car lighting.

Glasgow Tramways Committee have accepted the following tenders:—Points and crossings and special junction work, Hadfields, Ltd.; chilled-iron brake blocks (three months), Miller and Co., Ltd.; steel axles (six months), Glasgow Railway Engineering Co., Ltd.; steel tires (six months), Brown-Bayley's Steelworks, Ltd.

Accrington Council have allotted contracts as appended:—British Thomson-Houston Co., 2,000 kw. turbo-alternator, water-condenser, etc; Lancashire Water Cooler Co., water-cooling tower; E. Bennis and Co., modernising one set of mechanical stokers; J. P. Hall and Sons, boiler-feed pumps; Messrs. Holden and Brook, feed water heater.

FINANCIAL REPORTS AND MEETINGS.

British Electric Traction Company.—A dividend of 3 per cent. on the new ordinary stock is announced for the year ended March 31.

Kidderminster and District Electric Lighting and Traction Company.—The directors announce a dividend of 3½ per cent. for the past year.

Birmingham District Power and Traction Company.—The annual report gives the revenue for 1916 as £101,909, and the surplus, after providing £9,000 for renewals, £58,738. It is proposed to add to reserve £5,000, pay a dividend on the preferred ordinary shares of 4½ per cent., and carry forward £2,551.

Accrington Corporation Tramways.—Traffic revenue for the year ended March 31 reached the sum of 12.86*d.* per car mile, while the working expenses were 8.67*d.* The total receipts were £29,393, as against £27,850, the working expenses being £19,498 as compared with £16,438. Passengers numbered 4,841,334.

West Hartlepool Corporation Tramways.—Alderman Martin, chairman of the Tramways Committee, has reported a profit of £1,278 on the tramways last year. This amount had been added to the reserve, which now stands at £5,706. The annual statement of the electricity undertaking shows a net increase in income of £1,295, and a credit balance of £316, against £44 in the preceding year.

L.C.C. Tramway Accounts.—The report of the District Auditor on the accounts of the London County Council for the year 1914–15 gives the following comparative statement of tramways income and expenditure:—

	Year ended March 31, 1914.		Year ended March 31, 1915.	
	Income.	Expenditure.	Income.	Expenditure.
	£	£	£	£
Electric traction	2,247,043	1,585,251	2,389,046	1,684,244
Horse traction ..	21,626	30,215	10,801	16,328
	£2,268,669	£1,615,466	£2,399,847	£1,700,572

For the year ended March 31, 1915, the expenditure included a charge of £42,209, covering allowances made to officers and employees in the tramways department who were serving with the Forces. The surplus on revenue (working) account for 1914–15 amounted to £699,276. The net revenue account showed a deficiency of £33,173, which has been met out of the general reserve fund. In regard to this fund the auditor remarks that the Council on June 23, 1908, agreed that provision should be made for renewals at the rate of two-thirds of a penny per car mile run, this basis to be reconsidered at the end of five years. It was also agreed that the balance remaining on the net revenue account, after providing for renewals on the basis referred to, should be carried to the general reserve fund for providing for general contingencies. Owing to the changed financial position of the undertaking, reconsideration of the subject has been postponed to April 15, 1917. Full provision was made on the original basis up to the year ended March 31, 1912. In the following year the sum required to be provided was £150,309, but the sum available was only £497. There were deficiencies on the net revenue accounts for the years ended respectively March 31, 1914 and 1915, and no provision for renewals has been made during those two years. The balance of the renewals fund on March 31, 1915, was £402,015. The general reserve fund on March 31, 1915, amounted to £163,050. The aggregate capital expenditure to March 31, 1915, amounted to £13,315,723, made up as follows:—

In respect of electric traction	£11,189,215
" " " horse traction	142,399
" " " obsolete lines	1,984,109

The net debt at March 31, 1915, amounted to £9,836,187.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended May 6, the latest period for which full returns are available, give total receipts of £185,421, or £11,426 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £78 10*s.* per mile of single track, and last year at the rate of £75 18*s.* 11*d.*, thus showing an increase for the week of £2 11*s.* 1*d.* per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. May 18.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	69½	69¾
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	70	73/1½
4%	4%	Do. 4% Deb. ...	100	91	74	74½
4½%	4½%	Do. 4½% Deb. ...	100	98½	75	73
5%	5%	Do. 5% Deb. ...	100	96	78½	78½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	18/6xd	19/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	95½	95½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅞	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	85	85
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	58½	55½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	93½	92
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 13/16	6 13/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	89/4½	89/4½
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	38	35
6%	5%	Do. Pref. Ord....	100	106	39¾	39¾
5%	5%	Do. 5% Cum. Pref.	100	103	55	55
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	81	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	62	61½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	72½	71½
70/-	70/-*	Do. 7% Pref.	100	55½	46¾	47½
—	—	Do. 6% Pref. Ord.	100	17½	16¾	17
—	—	Do. Def. Ord.	100	11	9½	9¾
5%	5%	Do. 5% Deb.	100	92	78	78¾
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	68	68xd
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	5 13/16xd	6 1/16
1/3	1/3	City of B.A. Trams.	5	5½	91/6xd	91/6
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	85¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11	11
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	¾	2/1½	1/9
5/6	6/-	Lanarkshire Trys. Co.	10	10½	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	9/-	9/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89⅞	89
5%	5%	Do. 5% Inc. Deb.	100	88½	80	79½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48	49½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾xd	103¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70½	70
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½	80½
$1½	$1½	Mexico Trams. Common ...	$100	70	26	24¾
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43	39½
6%	6%	Do. 6% Mt. Bds.	100	76	35	35
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94	94
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92	93xd
1/2*	1/2¾*	National Steam Car	1	15/32	16/-	15/-
9¾d.*	9¾d.*	New General Traction	1	¾	7/9	7/9
6d.	8½d.	Northern Gen. Trams. Ord. ...	1	8½	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	55/-	55/-
5%	5%	Do. 5% 1st Deb.	100	89½	75xd	75
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	15/32	10/7½	10/7½
8d.	10d.	Provincial Trams. Ord.	1	¾	17/6	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	87	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	90½	90
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75¼	74½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89½	88½
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	78½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	93¾	94
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	91¾	91¾
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	73	73
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	1915-16	Aggregate. Wks.	1915-16	Increase or Dec.
Anglo-Argentine	May 13	£53,137	£54,974	20	£976,161	+ £837
Auckland.....(28 days)	Apr. 7	20,216	20,767	40	210,704	+ 3,553
Ballarat and Bendigo ...	Mar. 26	3,548	3,881	52	43,724	— 2,385
Brazilian Traction Mrs.	Mar.	6,294,910	6,711,000	13	19,220,000	+1,131,400
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia.....$	Mar.	557,135	577,117	39	4,982,147	— 772,894
Buenos Aires Lacroze ...	Apr. 10	41,765	40,220	43	413,102	— 8,139
Burmah Tramway ... Rs.	May 12	3,496	3,911	41	...	+ 7,608
Calcutta.....Rs.	„ 13	61,831	65,636	20	1,287,454	+ 82,900
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	Apr.	1,496	2,513	18	9,930	+ 3,272
Cordoba	Mar.	12,746	13,598	52	161,906	+ 6,251
East India	Apr.	1,864	2,116	39	18,706	+ 1,466
Hong Kong .....$	Apr. 15	9,874	13,379	18	199 143	+ 27,264
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Mar.	34,185	34,159	13	101,073	+ 3,681
Lisbon .....Escu.	Mar.	...	175,706	13	522,600	...
Madras (2 weeks).....Rs.	May 15	29,026	30,154	19	281,624	+ 24,537
Manila .....$	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Mexico .....$	*	...	...	...	...	...
Montevideo	Apr.	26,786	28,997	26	187,419	+ 12,764
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Apr.	4,964	4,849	18	19,787	— 74
Shanghai .....$	Apr. 12	23,734	28,502	...	...	...
Singapore .....$	Apr. 8	11,931	13,961	14	171,115	+ 21,141
Toronto.....$	Mar.	820,750	910,969	13	2,663,575	+ 232,148
Winnipeg	Mar.	303,209	296,500	13	887,310	— 81,239

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Aggregate. Wks.	1916	Incr. or Dec.
Aberdare	May 9	£335	£335	nil	6	£2,170	+ £157
Aberdeen Corporation...	„ 10	1,639	1,663	+ 24	49	87,277	+ 5,500
Accrington Corp.....	„ 10	542	549	+ 7	6	3,397	+ 123
Ayr Corporation	„ 13	340	299	— 41	52	18,272	+ 1,188
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 14	1,327	1,433	+ 106	6½	9,128	+ 600
Birmingham Corp.	„ 13	12,940	15,827	+ 2.887	6	109,064	+ 17,021
Do. Motor Omnibuses	„ 13	748	838	+ 90	6	5,426	+ 625
Blackburn Corp.....	„ 10	1,252	1,166	— 86	6½	8,377	+ 121
Blackpool & Fleetwood.	„ 13	369	419	+ 50	19	7,767	+ 886
Blackpool Corp.	„ 11	700	827	+ 127	6	8,571	+ 2,331
Bolton Corporation.....	„ 14	2,722	2,710	— 12	7	18,347	+ 495
Bournemouth Corp.....	„ 17	1,861	2,075	+ 214	7	15,106	+ 223
Bradford Corporation ...	„ 13	6,865	6,261	— 604	6	42,002	— 126
Brighton Corporation ...	„ 7	999	1,066	+ 67	5¾	5,944	+ 424
Bristol	„ 12	9,087	9,306	+ 219	19	176,926	+ 10,218
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 13	1,564	1,646	+ 82	7	12,164	+ 1,130
Burton-on-Trent Corp...	„ 14	284	251	+ 33	6	1,587	— 178
Bury Corporation.....	„ 14	1,294	1,314	+ 20	6¾	9,143	+ 160
Cardiff Corporation.....	Apr. 22	2,426	2,693	+ 267	3	8,763	— 92
Chatham & District.....	May 11	1,128	1,137	+ 9	19	20,598	+ 1,099
Chesterfield Corp.	„ 4	265	271	+ 6	5	1,412	+ 106
Colne Corporation	„ 13	241	259	+ 18	...	...	...
Cork Electric	„ 11	563	446	— 117	19	8,630	— 109
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	May 16	1,021	1,084	+ 63	6½	6,895	+ 300
Dover Corporation	„ 13	288	281	— 7	6	1,844	— 7
Dublin & Lucan	„ 12	150	113	— 37	19	2,212	— 264
Dublin United	Apr. 14	6,326	5,989	— 337	15	87,417	+ 3,402
Dundee City	May 10	1,302	1,302	nil	51¾	69,551	+ 3,756
East Ham Corporation	„ 13	1,358	1,252	— 106	6½	7,910	— 309
Exeter Corporation.....	„ 12	363	346	— 17	6	2,218	+ 13
Glasgow Corporation	„ 13	22,014	22,584	+ 570	50	1,088,722	+ 77,159
Glasgow Subway.....	„ 13	1,073	1,180	+ 107	19	23,477	+ 2,710
Glossop (U. Elec. Supp.)	„ 13	124	136	+ 12	20	2,624	+ 371
Halifax Corporation.....	„ 9	2,105	1,982	— 173	5¾	12,699	+ 44
Do. Motor Omnibuses	„ 9	46	39	— 7	5½	250	— 40
Hastings & District.....	„ 12	902	865	— 37	19	15,262	+ 342
Huddersfield Corp.	„ 13	2,542	2,744	+ 202	6	17,799	+ 2,090
Hull Corporation	„ 13	2,882	3,033	+ 151	6	18,767	— 865
Ilford U.D.C.	„ 13	633	643	+ 10	6	4,253	+ 391
Ilkeston Corporation ...	„ 17	125	132	+ 7	7	912	+ 59
Ipswich Corporation	„ 13	427	459	+ 32	6	2,929	+ 243
Isle of Thanet	„ 13	323	263	— 60	32	8,415	— 1,298
Kilmarnock Corp.	„ 13	212	199	— 13	52	8,353	+ 331
Lanarkshire	„ 11	1,831	2,112	+ 281	19	40,837	+ 7,021
Lancashire United	„ 10	1,690	1,658	— 32	19	31,310	+ 1,818
Leeds City.....	„ 13	8,593	9,100	+ 507	7	59,593	+ 6,885
Leicester Corporation ...	„ 13	3,014	3,263	+ 249	19	61,860	+ 7,467
Leith Corporation	„ 13	717	810	+ 93	52	40,112	+ 3,765
Leyton U.D.C.....	„ 11	1,619	1,465	— 154	6	9,628	— 199
Liverpool Corporation...	„ 13	13,333	13,952	+ 619	19½	255,990	+ 13,100
Llandudno & Colwyn B.	„ 12	304	265	— 39	23¼	5,156	— 203
London County Council	„ 3	50,155	46,931	— 3,224	4½	222,743	— 10,033
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	„ 13	152	118	— 34	31½	4,099	— 1,191
Maidstone Corporation..	„ 11	198	187	— 11	6	1,356	+ 1
Manchester Corp.....	„ 13	17,595	17,971	+ 376	6	114,156	+ 6,537
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	Apr. 22	169	269	+ 100	3½	737	+ 62
N'castle-on-Tyne Corp.	May 13	6,092	6,158	+ 66	6	37,543	+ 687
Newport (Mon.) Corp....	„ 13	806	856	+ 50	6	5,558	+ 1,179
New St. Helens & Dist.	„ 10	938	855	— 83	45	44,737	+ 3,348
Northampton Corp.....	„ 12	731	697	— 34	6	4,178	— 280
Nottingham Corp.....	„ 11	3,539	3,617	+ 78	6	22,408	+ 747
Oldham Corporation ...	„ 14	2,223	2,321	+ 98	7	17,904	+ 1,008
Portsmouth Corp.....	„ 13	2,451	3,496	+ 45	7	16,345	...
Preston Corporation.....	„ 10	914	1,045	+ 131	5⅞	6,068	+ 534
Provincial	„ 13	2,152	2,163	+ 11	32	67,309	+ 4,238
Reading Corporation.....	„ 11	777	786	+ 9	5⅞	4,736	+ 387
Rhondda Tramways.....	Apr. 27	1,107	1,684	+ 577	17	20,113	+ 1,159
Rochdale Corporation...	May 13	1,620	1,658	+ 38	6½	11,413	+ 508
Rotherham Corp.....	„ 17	1,056	1,360	+ 304	6⅞	9,347	+ 2,251
Salford Corporation.....	„ 15	4,998	5,206	+ 208	6¾	34,503	+ 1,926
Sheffield Corporation....	„ 14	8,437	10,036	+ 1,599	7	71,535	+ 11,935
Southampton Corp.....	„ 10	1,446	1,511	+ 65	5⅞	8,797	+ 507
Southend-on-Sea Corp...	„ 10	887	688	+ 199	6	4,423	— 510
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 18	735	735	nil	6½	4,818	+ 258
Sunderland Corp.....	„ 14	1,426	1,456	+ 30	6	9,589	+ 291
Sunderland District...	„ 10	546	494	— 52	28	15,990	+ 1,027
Swindon Corporation ...	„ 3	197	201	+ 4	4⅞	938	+ 63
Torquay Tramways.....	„ 4	530	626	+ 96	18	8,219	+ 48
Tyneside Trys. & Tmrds.	„ 10	582	507	— 75	19	9,584	— 361
Wallasey Corporation ...	„ 13	1,164	1,207	+ 43	6½	8,058	+ 364
Walsall Corporation.....	„ 13	705	774	+ 69	20	15,139	+ 2,100
Walthamstow U.D.C....	„ 13	861	891	+ 30	6	6,376	+ 1,076
Warrington Corp.....	Apr. 27	420	525	+ 105	4	1,911	+ 245
West Ham Corporation	May 11	3,244	3,106	— 138	5⅞	18,924	+ 675
Wigan Corporation	„ 11	1,450	1,559	+ 109	6	9,732	+ 581
Wolverhampton Corp....	Apr. 27	1,020	1,159	+ 139	7	8,153	+ 992
Yorkshire (W. Riding)...	May 14	1,452	1,803	+ 351	20	33,114	+ 3,486

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,

AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 27.] LONDON, SATURDAY, MAY 27, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

DUBLIN CORPORATION ELECTRICITY SUPPLY.

CAST-IRON EXHAUST PIPES.

The Electricity Supply Committee of the Corporation of Dublin invite Estimates for the Supply, Delivery, and Erection of certain Cast-iron Exhaust Pipes and Supports for their 1,500-k.w. Belliss Engine.

Details of the work, as well as Specification and Tender Form, may be obtained from the "City Electrical Engineer," Pigeon House Fort Electricity Works, Dublin, on and after May 23, 1916, on payment of One Guinea, which will be returned on receipt of a bona-fide Tender.

Tenders, sealed and endorsed "Tender for Cast-iron Pipe Work," must be addressed to "The Chairman, Electricity Supply Committee, Lord Edward Street, Dublin," and delivered there not later than 12 noon on Tuesday, May 30, 1916.

The Committee do not bind themselves to accept the lowest or any Tender.

Electricity Supply Committee Offices, Lord Edward Street, Dublin. May 19, 1916. FRED J. ALLAN, Secretary.

CITY OF MANCHESTER.

ELECTRIC CAPSTAN.

The Electricity Committee of the Manchester Corporation are prepared to receive Tenders for the Supply and Delivery, at their Stuart Street Station, of an Electric Capstan.

Specification and Form of Tender may be had on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester.

Further particulars can be obtained on application to Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall not later than 10 a.m. Wednesday, June 7, 1916.

The firms entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any Tender.

Town Hall, Manchester. May 18, 1916. THOMAS HUDSON, Town Clerk.

MATLOCK URBAN DISTRICT COUNCIL.

TRAMWAY CABLE.

The above Council are prepared to receive Tenders for about 1967 Lineal Yards of Patent Steel Wire Tramway Cable, 3⅛in. in circumference, with Manilla Core, delivered at their Depôt, Matlock, carriage paid.

Particulars, specifications, and terms as to payment, may be obtained from Mr. John D. Evans, Tramway Manager.

Tenders, to be accompanied by samples of wires, to be delivered at my office (marked "Cable") not later than 12 noon on Saturday, June 10, 1916.

The Council do not bind themselves to accept the lowest or any Tender.

Town Hall, Matlock, May 24, 1916. R. TAYLOR, Clerk to the Council.

BARKING TOWN URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

TENDERS FOR COAL.

The above Council invite Tenders for the Supply of Slack or Beans over periods of Six and Twelve Months.

Specification, Conditions of Contract and Form of Tender may be obtained from the Engineer and Manager, Electricity Works, Barking.

Tenders, endorsed "Tenders for Coal," may be delivered to the Chairman of the Electricity and Tramways Committee at 5 p.m. on Friday, June 9 next, or be sent by post, or delivered, to the Clerk to the Council so as to reach him before the date and time mentioned.

The Council do not bind themselves to accept the lowest or any Tender.

By order of the Council,
E. A. PRATT,
Acting Clerk.

Public Offices, Barking, Essex.
May 19, 1916.

POSITIONS VACANT.

COUNTY BOROUGH OF EASTBOURNE.

ELECTRICITY DEPARTMENT.

MAINS ENGINEER.

The Electricity Committee invite applications for the position of Mains Engineer at a salary of £156 per annum. The appointment will be permanent, subject to a month's notice on either side.

Applicants must have had a sound mechanical and electrical engineering training and must have had experience with a system employing single-phase high and low tension mains distribution.

Applications, written on foolscap, stating age, whether married or single, and giving full particulars of training and experience with dates in chronological order, accompanied by copies of not more than three recent testimonials and endorsed "Mains Engineer," to be sent by post only to the undersigned not later than 5 p.m. on Friday, June 9, 1916.

Electricity Works, Eastbourne. May 18, 1916. J. K. BRYDGES, Borough Electrical Engineer.

HOLYHEAD URBAN DISTRICT COUNCIL.

SHIFT ENGINEER.

Shift Engineer wanted, who is not eligible for enlistment. Preference given to one who has previous experience in a direct-current three-wire generating station, and is able to do jointing on three-core cables.

Apply, stating age (wages 32s. 6d. per week), with particulars of experience, and three copies of recent testimonials, not later than June 4th, 1916, to

Electricity Works, Holyhead. P. WILLIAMS.

MECHANICAL ENGINEER AND ELECTRICIAN.

Huddersfield Corporation require the services of a good Mechanical Engineer and Electrician. Ineligible for military service. For particulars of duties apply to "Borough Engineer."

SUB-STATION ATTENDANT.

Wanted at once, Sub-Station Attendant, one accustomed to Rotary Converters on E.H.T. supply preferred. Salary 35s. per week. Apply, stating age and full details of experience, with copies of recent testimonials, to the Chief Engineer, Electricity Works, Luton.

SECOND-HAND CARS.

Advertiser requires information of secondhand double deck or single deck cars (the former preferred) for sale. Reply, giving particulars of prices of cars, with spares available, including prices to contractor.—Box No. 38, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

Digitized by Google

FOREMAN OVERHEAD LINESMAN.

Foreman Overhead Linesman required; ineligible for service. Full particulars as to past experience, and wages required, to Engineer, Corporation Tramways, Portsmouth.

SHIFT ENGINEER.

Shift Engineer required; ineligible for service. Wages 40s. to 45s. per week, according to qualifications.

Applications with full particulars to Engineer, Corporation Tramways, Portsmouth.

SHIFT ENGINEER.

Shift Engineer required for small Traction and Lighting Station. Must be able to keep plant in running order. Applications, stating age, experience and wages required, to be sent to the Manager, Great Grimsby Street Tramways Company, Cleethorpes, Lincs.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 8488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS' SUPERFINE PAINTS
and
EXTRA DURABLE VARNISHES
for
TRAMCARS.

DOCKERS' "HERMATOR" PAINTS AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, MAY 27, 1916.

PROGRESS IN TIME OF WAR.

Problems evolved by the war have not imposed a condition of stagnation upon managers, notwithstanding the shortage of men on the platform and in the workshop. We have recently described what is being done at Liverpool and Newcastle-on-Tyne as regards the production of cars that facilitate rapid loading and unloading; and since then particulars have been given of the ingenious means by which the Bradford Tramways department hope to improve goods transport in that city. Seven months ago, too, Leeds inaugurated the carriage of minerals on the tramways, and as such traffic has been fully provided for in the local Acts the Tramways Committee are considering a report by the manager on the prospects of utilising the tramways for goods traffic in districts situated a long distance from railway termini. The foregoing are indications that enterprise on the part of managers is likely to be supported by their committees. With a critical time to come in the form of a greater shortage of men through the operation of compulsory military service for married men up to forty-one years of age, there will be a still greater call upon the resource of managers. Cars operated by one man would not afford any great amount of relief now that women are available as conductors, but where single-deck cars of sufficiently small seating capacity are available an experiment might be made on lines where traffic is not heavy, or during the slack hours on others. A new car of this kind is creating great interest in the United States. It is 22 ft. 10 in. in length, has only one platform, is mounted on a Brill single truck, weighs under 10,000 pounds, and seats thirty persons. Two of these vehicles have proved so successful that an order has been placed for ten others. The car is spoken of as coming into the field at a most opportune time, when appreciation of the economic value of single-truck cars and the one-man method of operation seems to have become general. Further, it is stated that investigation has shown that the average load of a car during the fifteen hours of each day in many towns and districts does not rise above twenty passengers, hence the scope for this new car. All the leaving and entering passengers are directly under the observation of the motorman, thus guarding against accidents. At the rear is an emergency door, which is fastened by pneumatically and manually operated locks, the former being so arranged that in case of emergency it disengages the door, which then may be opened by the passengers. If the motorman takes his hand from the controller handle in any position in which the power is flowing to the motors, the current is cut off, the front door is opened, the rear door is unlocked, the brakes are applied and sand is released. Experiments with one-man cars in this country have not been numerous, and further effort might provide useful lessons in the adaptation of rolling-stock to various local needs.

TRAMWAY EMPLOYEES' CONFERENCE.

OPPOSITION TO WOMEN DRIVERS.—WOMEN CONDUCTORS' WAGES AT LEEDS.

At the annual conference of the Amalgamated Association of Tramway and Vehicle Workers, held at Sheffield, on May 23, a resolution was unanimously passed calling upon the Association to use their influence against the employment of women as tramcar drivers. The speakers contended that women engaged in such work would increase the danger to the public, and that the welfare of future generations would be endangered. It was urged by one speaker that the services should be reduced if men could not be obtained as motormen, and while some tramways committees were referred to as being determined to employ women as drivers, managers generally were described as being opposed to women on the front platform.

A resolution was passed declaring that the conditions of service of women conductors in Leeds and some other places was a serious menace to male labour, and that steps should be taken to obtain similar concessions to those of the men. A Leeds delegate stated that the local branch had failed to induce the Corporation to pay the women the same as the men, and that the former were receiving only 5½*d.* an hour.

Mr. N. Bradwell, a Sheffield motorman, was re-elected President with 8,305 votes to 7,781 recorded for a Salford candidate.

The conference decided to circulate among the branches the report of an interview with the Board of Trade relative to women drivers; the document hitherto had been treated as confidential. The President said the Board's only objective was to release men for the army, and if the Association relied on the Board of Trade it was relying on a broken reed.

It was resolved to support the Bradford and Leeds branches in their efforts to secure extra rates for Sunday and early cars for munition workers. Asked if this action would not put the employees in a better position than those in other towns, the President replied that Leeds and Bradford were the most backward towns in the North.

In an interview on the question of the pay of women conductors at Leeds, Mr. J. B. Hamilton, the general manager, has stated that their wages range from 27*s.* 6*d.* to 30*s.* per week. They were content with those wages, and there was a stream of hundreds of applicants for the jobs as they became vacant. The only possible justification that the men's union could have for their complaint was that the women conductors were not given an advance after six months' service, and that they did not receive a war bonus. Women conductors were started at the men's rate of 5½*d.* per hour, and at that wage they remained. They were only temporary employees; they were not so readily trained as men; and the cost of their clothing was nearly double that of the men.

HULL EMPLOYEES' FIXED HOURS OF WORK.

Alderman Hargreaves, Lord Mayor of Hull, in retiring from the chair of the Tramways Committee on May 24, reviewed the work of the Committee during the past three years. His lordship mentioned that the employees' hours of labour had been adjusted by a system that did not exist in any other city in the country. The men began duty at a certain time and knew exactly the hour at which their day's work was ended. Overtime could not be avoided, but it was overtime without compulsion, as volunteers had always been ready to come forward. During the three years the cost of car maintenance had been reduced by £12,000.

Half-penny stages had produced gratifying results, the income having increased from 8½*d.* per car mile to 9½*d.* At the end of the last financial year the department had an actual profit of £12,469, of which £10,000 went in relief of the rates, and £2,469 passed to the reserve fund, which now stood at £142,000. This was all the more striking when it was remembered that the Committee were paying £4,078 annually in war bonus, and £8,759 per annum to men who had joined the forces. There was an increase in the coal bill of £1,997, and it should not be forgotten that soldiers were carried for nothing, this being estimated by the manager as equal to four million passengers. The population had been reduced in two years by enlistment from 291,118 to 269,530.

Digitized by Google

THE EMPLOYMENT OF WOMEN.

At Glasgow the number of women tramcar drivers on May 20 was 84, while the conductors numbered 1,200, as against 400 men. By the end of May all of the 500 male cleaners of cars will have been replaced by women. Well educated women have so successfully attended to switchboards in the power stations that they are being placed in charge of sub-stations.

To fill vacancies that will be caused by the calling up of the attested married conductors at Aberdeen, one hundred additional women are being trained as conductors. The department have decided not to employ women as drivers.

More than 100 women conductors are employed at Blackpool, but the Watch Committee have decided not to grant licences to women to act as car drivers. Several are receiving instruction on the cars of the Blackpool, St. Annes and Lytham Company.

The Lord Mayor of Hull on May 24 observed that despite of the opposition at the outset, none of the Tramways Committee would regret the employment of women as conductors. Without them the services could not have been continued. The Committee had kept faith with the men by refusing to increase the number of women, so long as men were available. Since March no women had been put on, while employment had been given to 45 men who had been discharged from the army.

Women are now employed as car cleaners at Sheffield at the men's rate of pay, viz., 7*d.* per hour for a 45-hour week, the work being done at night. They are also receiving a war bonus of 2*s.*, making a total payment of 28*s.* 3*d.* Sir Wm. Clegg, chairman of the Tramways Committee, has stated that the women conductors received 6*d.* per hour and a 2*s.* war bonus. The manager had prepared statistics based on information given by the women entering their employment, and he found that their average wages before they entered the service of the department were only 12*s.* 11*d.* per week, as compared with 29*s.* 6*d.* In June a number would have completed twelve months' service, and would receive an additional 1*s.* per week as merit pay for good conduct and good service, and in another six months they would be entitled to a further 1*s.* per week. About 600 women were employed by the department, and were performing their duties very satisfactorily.

By 36 votes to five Salford Council have rejected a proposal made by Alderman Jackson to pay to all women employed upon the cars and in the sheds a war bonus equal to that paid to men performing similar duties. Alderman Linsley, chairman of the Tramways Committee, said the women were satisfied with their pay. A bonus would cost £1,400 a year. At Manchester the Tramways Committee were compelled to pay the bonus by the City Council, whose resolution applied to all employees irrespective of sex.

DEPRECIATION RATES AT GLASGOW.

Glasgow Corporation on May 11 considered a recommendation by the Tramways Committee that in making up the annual accounts of the department depreciation for the current year shall be at the following rates:—

Permanent way		£350	per mile.
Electric equipment of line	Average	2.9	per cent.
Ground		—	,,
Buildings and fixtures		2½	,,
Power station and sub-stations plant		5	,,
Workshop tools and sundry plant		5	,,
Cars	Average	8.2	,,
Electric equipment of cars		6	,,
Other rolling stock	Average	16.4	,,
Miscellaneous equipment		5	,,

Councillor Battersby moved that the recommendation that depreciation be at the same rates as last year be remitted back for further consideration. He contended it was true that the Corporation secured some of the money devoted to the depreciation fund. Treasurer M'Millan seconded. He said that in a time like this, when the Common Good had been depleted for the last two years, the Tramways Department, which was really part of the Common Good, should reconsider the depreciation rate.

Councillors McFarlane and Montgomery supported the recommendation, which was adopted by a large majority.

L.C.C. TRAMWAY MATTERS.

In addition to the business reported in our last issue the following reports were presented by the Highways Committee and were adopted:—

THROUGH RUNNING ARRANGEMENTS.

Since August 1, 1913, the receipts on the through running routes via Lea Bridge Road, have been pooled and divided between the Council and Leyton Urban Council according to the mileage run by each authority, the County Council being entitled to run mileage equivalent to the whole of the through mileage attributable to the London area, and 7½ per cent. of the total through mileage attributable to the Leyton area. This method of allocating receipts expired on December 7, 1915, and the Committee have agreed with the district council that it shall be continued for a further period of twelve months, and thereafter until terminated by six months' notice given by either party.

West Ham Corporation have given six months' notice to expire on October 5, 1916, to terminate the agreement dated December 16, 1910, between the Council, West Ham Corporation, East Ham Corporation, and Leyton Urban Council, for through running via Bow Bridge over certain tramways belonging to the authorities mentioned.

It has been decided to suspend until after the war the issue of the 9*d.* return tickets between Waterloo Bridge and Northumberland Heath, Bexley, in connection with the through booking arrangements with Bexley Urban Council.

EFFECT OF THE WAR ON CONTRACTS.

The Stores and Contracts Committee reported soon after the outbreak of war that a large number of the Council's stores and general maintenance contracts, etc., had been affected, and indicated their policy for dealing with such contracts. During the past quarter they have continued the policy both as regards contracts entered into before the war and other contracts for stores, the supply of which has been affected by circumstances which could not be foreseen. In many cases the Committee have allowed contractors to charge increased prices, and they have made such allowance on condition that the firms will revert to the contract prices when called upon to do so. They have called the special attention of the respective committees to the serious difficulties that have arisen in obtaining supplies of stores required for the various services, and have pointed out that these difficulties are likely to increase. They suggest that the Committees should make special provision for those goods that are vital to the maintenance of important services.

MISCELLANEOUS NEWS AND NOTES.

Swansea Tramways Committee are applying for an extension of time for the construction of the tramways authorised in Carmarthen Road and Port Tennant Road.

Reduction of Assessment.—After four unsuccessful appeals the East London Railway Company have secured a reduction on rateable value from £5,002 to £100.

Sydney Electric Railway.—The construction of a tunnel under Macquarie Street for the city electric railway project has been begun by Messrs. Norton Griffiths, Ltd.

Increased Charge for Energy at Croydon.—A special war charge of ¾*d.* per unit on all units above ten millions has been levied on Croydon Tramways department by the Electricity Committee.

Suggested South Lancashire Extension.—In connection with the opening of new coal mines at Astley the South Lancashire Tramways Company have been asked to extend their tramways to the district.

Collision at Nottingham.—On May 20 a down car on the Sherwood Rise got beyond control, left the rails and dashed into an up car. A number of passengers were slightly injured, and one of the drivers sustained a fractured leg and was fixed so tightly against the staircase that he was not released until after half an hour's work.

War Distinctions for Leeds Employees.—At the end of the past financial year there were 473 employees of Leeds Tramways department on active service. Motorman J. Band has been awarded the D.C.M., and Inspector R. Dalby and Conductor W. Geldard have been mentioned in despatches. Ten men, including Inspector Dalby, have lost their lives.

Special Cars at Reading.—During the past year the Reading tramways department provided 54 cars free of charge for wounded soldiers. The number of special cars running daily is now eighteen. Some of these are used by school children, of whom 228,820 travelled last year—exclusive of those conveyed by special cars—as against 192,102 in the preceding year.

New Tramways.—A Bill has been introduced to enable the Guimarães municipality, Portugal, to borrow £70,000 for the construction of public works, including a tramway to Braga. Authority has been given by the Governor-in-Council, Victoria, to the Prahran and Malvern Tramways Trust to construct an electric tramway of 4-ft. 8½-in., from Kew to Malvern.

Boy's Trick on a Woman Conductor.—A boy of fourteen years is under remand at Doncaster on a charge of stealing 1*s.* 5*d.*, belonging to the Corporation. The lad boarded a car and took the woman's cash bag, tickets and punch, telling her he was learning to conduct. On leaving the car he returned the things and said he was going to see Mr. Rayner, the manager. The woman informed an inspector.

Heavy Damages.—A Canadian soldier who was run over by a tramcar in Kennington Road at midnight on October 11, was awarded £500 damages against the London County Council, in the High Court on May 18. Contributory negligence on the part of the soldier was urged, and it was also stated that owing to the darkness the driver did not see him until within three yards of him.

No German Coaches for Buenos Ayres.—Owing to the war the Buenos Ayres Western Railway directors were unable to obtain the coaches they had ordered from Germany for the electric service between Once and Moreno. British manufacturers had to decline the business owing to war work, and the coaches are now being constructed in the railway company's shops with the assistance of the Great Southern Railway.

Sheffield Tramways Power Station.—The Local Government Board have introduced a Bill to confirm a Provisional Order granted by the Board to Sheffield Corporation, providing that Kelham Island power station, with the plant, cables, tunnel, etc., used for generating power for the tramways, shall in future cease to be part of the tramway undertaking, and shall be deemed to be part of the electrical undertaking.

The Increased Workmen's Fares at Newcastle.—May 21 was the date when the increased fares for workmen came into force on the Corporation cars. The increase is threepence in the shilling and eighteenpence books, and twopence on the sixpenny books. Special offices have been opened for some time for the sale of the coupons, which have been purchased in large quantities. All workmen and workwomen who do not tender coupon tickets have to pay the full ordinary fare. With this regulation, all cars hitherto labelled "workmen's car" will be abolished.

Digitized by Google

etrograd Tramway Difficulties.—The Petrograd tramways are fo in in difficulties for fuel. With only enough petroleum on hand of sixteen days the management have notified a probable reduction service. The electric station consumes 250,000 poods of Petroleum per month. A report in the "Retch" hints at a complete stoppage of the tramways as possible. The number of cars has now increased to 680; over 200 repaired wagons have just been issued from the repairing shops. Besides these, ten new cars arrived unexpectedly, out of twenty that have been waiting in the Kolomensk factory for nearly a year.

Prospective Business in Australia.—The Fitzroy, Northcote, and Preston (Victoria) Tramways Trust are sending representatives to India to obtain information as to the running of petrol motor rail cars. A proposal is before the Eastern Northcote (Victoria) Council to construct a tramway at a cost of £20,300. The ratepayers of Port Adelaide have approved of the Council borrowing £12,000 for the construction of an electric tramway. A suggestion for the erection of a bridge at the Spit, over Sydney middle harbour, for tramways and general traffic, is under the consideration of the New South Wales Minister for Works. The estimated cost is £43,000.

Interesting Prosecution at Wigan.—Two men of the local Volunteer Corps were summoned at Wigan for refusing to pay their fares on a Corporation tramcar. Defendants claimed the right to share in the privilege of travelling at half fares, which had been granted to soldiers. For the Corporation it was maintained that the concession applied only to regular soldiers. Defendants' reply was that on April 9 Volunteer Corps all over the Kingdom were recognised as part of His Majesty's Forces. The Bench dismissed the summonses, expressing a hope that an amicable arrangement would be arrived at by the Tramways Committee, and refused to state a case for appeal.

Summonses Against Glasgow Vehicle Drivers.—Nearly forty drivers were fined 5s. each at Glasgow during the week ended May 20, for failing to observe the new traffic by-law. The previous by-law, which is superseded by the new regulation, referred only to streets where tramways had been laid down, and under it obstruction had to be proved. Under the new order it is an offence for slow-going vehicles to take the centre of any street, whether the road is clear or not, unless there is sufficient reason for doing so. The Tramways Department intend to bring all contraventions before the notice of the magistrates, and it is understood that proceedings have been instituted against nearly four hundred carters.

Cost of Permanent Way Maintenance in York.—A report presented by the Committee on Employment and Expenditure, who have investigated the work of the various departments of the Corporation, shows that for the tramways permanent way the average cost in seventy-one other towns per mile for maintenance is £168, and per car mile .52*d.* In York the cost per mile for maintenance is £30 and .12*d.* per car mile. The low figure for York is accounted for to some extent by the greater age of the tramways in other towns. The cost of road maintenance in York is £149 per mile, or 2*s.* 9*d.* per head of population, against an average of £162 and 3*s.* 7*d.* per head in thirty-four similar towns.

Unreliable German Turbo-Alternators.—In his annual report Mr. T. H. Aldridge, engineer-in-chief to Shanghai Municipal Council, records that the turbo-alternators of German manufacture that were installed two years ago at Riverside generating station have proved most unreliable. Two 2,000 kw. machines supplied by the A.E.G. of Berlin, which have been running less than two years have cost respectively £318 and £267 per annum for repairs, as against £40 each per annum for six British turbo-alternators that were purchased from five to nine years ago. The German machinery was offered at a low price and with guarantees of efficiency. Mr. Aldridge observes that troubles with machines of similar make have since come to light in Australia and England.

Special Constables' Fares.—Councillor G. New, chairman of Sunderland Tramways Committee, made some outspoken remarks in opposing the Watch Committee's request that special constables should be allowed to travel on the tramcars free of charge when going on or coming off duty. He said that in private life it was looked upon as dishonest and unfair, and a man was regarded as contemptible who tried to shift his responsibilities and burdens to the shoulders of others. If ordinary members of the police force travelled free, it was not because the Committee approved of it. The tramways were a business undertaking, and the object of the Committee was to work them for the benefit of the town. If patrol men were to be carried free, why not the whole of the special constables? The present proposal only intensified the evil in regard to regular constables. As reported in our last issue, the Council adopted an amendment that the cost be borne by the Watch Committee.

Tramways and Light Railways Congress.—Friday, June 30, has been definitely fixed as the date for the annual congress of the Tramways and Light Railways Association. The annual meeting will be held at 2.30 p.m. at the Westminster Palace Hotel, after which Mr. W. T. Robson, general manager of the Southampton Corporation Tramways, will read a paper entitled "Tramway Transit and Comfort; a Plea for the Passenger." After the discussion the members will be conveyed to the London General Omnibus Company's training school at Milman Street, Chelsea, where they will be received by the operating manager, Mr. H. E. Blain. After an inspection, etc., Mr. Blain will give an address on "The Safety Movement." At the annual dinner, to be held at 7.30 p.m. at the Trocadero Restaurant, the Hon. Arthur Stanley, M.P., will preside. Members are asked to notify the secretary at an early date how many tickets they will require for themselves and friends. Evening dress will be optional.

Maintenance During Shortage of Materials.—In his annual report, Mr. J. H. Cowell, general manager Blackburn Corporation Tramways, states that general repairs and maintenance had been well attended to, and the cars were in a high state of efficiency. Four miles of trolley wire had been renewed, another portion should be renewed during next year, but as the wire could not be purchased at the present time, he had had this portion anchored so that there would be less danger of accident in case of breakage. By this means the Committee would be able to defer renewal to another year. Renewals and repairs to the permanent way had been carried out where necessary. Another portion of the permanent way should be renewed during the coming year, but owing to the difficulty of obtaining rails, he thought it wise to leave it over for the present time. With a view to this, during the past year he had had renewed the really dangerous sections of the routes, so that the portions held over for renewing occur on the straight and not on inclines or curves. There are 119 employees serving with the forces.

Collapsible Hood for Omnibuses.—A new illustrated catalogue of the Beck patent collapsible hood for motor omnibuses and other vehicles has been issued by the Willesden Paper and Canvas Works, Ltd. A feature of the publication is that it reveals the simple and effective manner in which Mr. F. Beck, the patentee and manufacturer of the hood, has met our objection that the hood, when lowered, obstructed the front destination board. This drawback has been overcome by advancing the front board and moving the front seat on either side four inches towards the centre. The space thus provided at the sides accommodates the hinges of the framework, while the hood, when collapsed, rests between the advertisement board and the front barrier of the top deck. When closed the hood is thus entirely hidden from view. Another advantage is that the alteration gives additional space for advertisements upon what is the most prominent portion of the vehicle, namely, the side space immediately over the driver's canopy. Mr. Beck is deserving of congratulation upon the perseverance he has shown in perfecting an appliance that will have the effect of increasing the earnings of omnibuses, etc., in wet weather.

Transit and Town Planning.—At the Surveyors' Institution a paper was read by Mr. W. R. Davidge on "The Principles and Position of Town Planning," in the course of which he said that the provision of efficient and up-to-date means of transit was one of the most important items in the development of towns, yet strangely enough this essential detail was omitted from the calculations of many town-planners. He referred to Mr McElroy's report on the "Passenger Transportation Problem," to the Manchester Corporation, which he said was an excellent summary of what so far has been achieved in America and in the principal continental cities. In the course of the debate, Colonel R. C. Hellard, R.E., C.B. (superintendent of the London Traffic Branch of the Board of Trade) stated that his Branch would be closed after June 30 next. The work of future road improvements would now be left in the hands of the district conferences, which had already agreed to so many points that he thought they might hope for some improvement being carried out in the course of time.

Why Dundee is Without Women Conductors.—Replying to a suggestion made by a local correspondent that women should be engaged as conductors at Dundee, Mr. Peter Fisher, general manager of the Corporation Tramways, has stated that he knows of no tramways where women were employed so long as men were to be obtained, and there was not in every centre a supply of women available without taking them from other industries more indispensable than tramways. Women had been brought to Dundee from four other towns to be trained to work at local factories; thus it would appear that there was a shortage at Dundee. On the other hand there was a plentiful supply of discharged soldiers, and these men were being employed as conductors. In pleading for a more sympathetic attitude from the public towards these men, who were often put upon the cars after three days' training, Mr. Fisher says that many of them left the employment for the sole reason that they could not stand what was being said about them publicly —Great Yarmouth Tramways Committee having considered the question of the employment of women conductors, have decided to seek suitable men ineligible for military service.—Stirling and Bridge of Allan Tramways Company have recently begun to employ women conductors.

PERSONAL.

Mr. Edgar Allen, steel manufacturer, left £32,000 to Sheffield University for the provision of scholarships, half of them to go to the sons of working men.

Mr. A. C. L. Fell, chief officer of London County Council Tramways, is, we are glad to state, making satisfactory progress after his serious illness. It is hoped that he will be able to resume duty in a few weeks' time.

Alderman J. H. Hargreaves, Lord Mayor of Hull, having accepted the chairmanship of the Parliamentary Committee of the City Council, under a new by-law of the Corporation, has had to retire from the chair of the Tramways Committee. Councillor W. Wheatley was unanimously elected chairman of the Tramways Committee on May 24, and Councillor Hakes was appointed deputy-chairman.

Lieutenant Ben Fry, who for about three years prior to the war was purchasing agent for the Buenos Aires Lacroze Tramways and the Buenos Aires Central Railway, has been for the past sixteen months serving in the Army Ordnance Department. He was first posted to Tidworth, and then obtained a transfer to Devonport, where he remained until February last, when he received instructions to proceed to Liverpool. Lieut. Fry is now attached to the Railway Transport and Embarkation staff, which appointment is affording him an excellent opportunity of seeing the practical working of the railway at the port. We understand that Lieut. Fry is shortly to be married in London, and he will have the cordial good wishes of many friends for his future happiness and success.

Digitized by Google

CONTRACTS AND ORDERS.

London County Council have placed contracts with the British Westinghouse Company for the supply of traction glow lamps.

Nelson Tramways Committee have decided to have five additional trucks fitted with new car bodies by the United Electric Car Co., of Preston.

Southend Light Railways Committee have placed orders with Mr. D. B. Rose for cars, and with Messrs. R. W. Blackwell for strainers, wire bolts and mechanical frog for new overhead equipment on the Leigh route.

FINANCIAL REPORTS AND MEETINGS.

Birkenhead Corporation Tramways.—This undertaking has had a successful year, and £4,000 is the estimated amount to be given in aid of the rates.

Cape Town Consolidated Tramways and Land Company.—The accounts for 1915 show an adverse balance of £816, against £1,894 for the previous year. No dividends have been declared by any of the subsidiary companies.

Metropolitan Carriage, Wagon, and Finance Company.—The directors recommend a final dividend on the ordinary shares at the rate of twelve and one half per cent., making ten per cent. for the past year, and a bonus of five per cent.

Leicester Corporation Traffic Receipts.—We have been officially notified that the Tramways Committee have discontinued the publication of the weekly traffic receipts, as they consider the figures at the present time to be misleading, owing to the large increase in expenses.

L.C.C. Tramway Receipts.—The tramway receipts from April 1 to May 3 (four and a half weeks) were £222,743, a decrease of £10,033 as compared with the corresponding period of last year. For the four weeks ended May 3 the number of passengers carried was 44,552,833, a decrease of 1,341,304 as compared with the corresponding period of 1915, while the receipts were £189,183, a decrease of £5,721. The route mileage was 141.67 miles.

Lima Light, Power and Tramways Company.—The net profit during 1915 was £p.101,318.536, which, with balance brought forward, £p.50,077.967, makes £p.151,396.503. This the directors have divided as follows:—To reserve and redemption fund, £p.20,000; to reserve for bad and doubtful debts, £p.13,000; to amount written off value of shares owned by Empresas Eléctricas Asociadas in other Companies, £p.29,000; leaving £p.80,396.503 to be carried forward.

Dublin United Tramways.—Our list of Tramway and Omnibus Traffic Returns for the week ended May 19, records the gratifying fact that the receipts of the Dublin United Tramways Company have again become normal. There was, in fact, an increase of £79 19*s.* 5*d.* over the corresponding week of last year. For the previous week the total receipts amounted to £4,185 15*s.* 3*d.*, a decrease of £1,848 16*s.* 4*d.* The effect of the insurrection on the traffic receipts is shown by the total decrease of £8,686 for the twenty weeks of this year.

Electric Construction Company.—The net profits for the year ended March 31, after providing for debenture interest and £7,500 for depreciation, were £43,241, and £7,471 was brought forward. A dividend of seven and one half per cent. is proposed on the ordinary shares, adding to the reserve (which will then stand at £50,000), £12,664, and carrying forward £16,839. The unexecuted orders at the beginning of the new financial year exceeded those on hand a year ago. The company's works are a controlled establishment under the Munitions of War Act.

Callender's Cable and Construction Company.—The profits for 1915 were £113,267, and £163,169 was brought forward. A dividend of 10*s.*, a bonus of 5*s.*, and a special bonus of 5*s.* per share (together twenty per cent.) are proposed on the ordinary shares, carrying forward £207,347. For many previous years the distribution on the ordinary shares was at the rate of fifteen per cent. per annum. The company was declared a controlled establishment on Aug. 18, 1915, and the shareholders are assured, in the annual report, that no firm in the electrical industry has rendered more service to the nation than this company. A large number of women have taken the places of men who have joined the forces.

Anglo-Argentine Tramways.—The report of the Anglo-Argentine Tramways for 1915 makes a disappointing showing. It states that the gross receipts amounted to £2,709,615, less working expenses (which include various items amounting in the aggregate to £120,000 carried to the depreciation renewals reserve in addition to £265,692 expended on ordinary maintenance) £1,786,740, leaving £922,875, which, with interest on investments and deposits, £45,403, transfer fees, etc., £233, and the amount brought forward, £96,408, makes £1,064,921. Interest and charges absorb £970,801, leaving balance of net revenue account, £94,120. The receipts show a decrease of £141,380, and the expenditure has been reduced by £94,256, and now probably represents the minimum compatible with efficiency, while the position is aggravated by the continuous rise in the price of fuel, upon which the price paid for electric current is based. In these circumstances, and having regard to the difficulty of forecasting the results of the present year, the directors were unable to recommend the payment of a dividend on the ordinary shares. The balance at the credit of profit and loss, £94,120, has accordingly been carried forward.

Heavy Loads and Less Mileage at Birmingham.—A report on the working of the Birmingham Corporation Tramways during the year ended March 31 last was presented to the Tramways Committee on May 15. The traffic revenue increased by about £125,000, and the number of passengers by fourteen millions, the total being 163 millions, as against 149 millions. The number of miles run was 14,151,000, as against 14,232,000. Therefore the cars were more heavily loaded, the department, owing to shortage in staff, being unable to put on extra cars. The working expenses per car mile increased considerably, chiefly owing to the amount given to dependents of employees who are now with the colours. This sum amounted to £37,600, as compared with £17,000 the previous year.

Swansea Improvements and Tramways Company.—The revenue for the past year amounted to £65,085, being a decrease of £1,631. The traffic receipts amounted to £63,088, showing a decrease of £2,047. After deducting all expenses chargeable to revenue, including debenture and other interest, and the amount payable to Swansea Corporation in respect of the tramways and light railways leased from them (including £517 16*s.*, being two per cent. on the gross profits for the year), and after setting aside the sum of £4,000 for renewals, there remains a surplus of £12,982. The addition of the sum of £2,831 brought forward, brings the available balance up to £15,813. This is allocated as follows:—£3,000 to reserve, £590 dividend on six per cent. preference shares; £7,800 dividend on ordinary shares (making six per cent. for the year), and £2,415 as the carry-forward. The expenditure on capital account was £866.

Bradford Corporation Tramways.—The city treasurer on May 15 presented the annual statement of accounts relating to the working of the tramways in 1915-16. The traffic income amounted to £314,500, an increase of £9,500, and working out at 12.8*d.* per car mile, against 11.8*d.* The traffic portion of the working expenses amounted to £88,000, against £87,100, or 3.6*d.* per car mile, against 3.4*d.* The direct contribution to rates amounted to £15,700, an increase of £500; and in addition £25,000 was appropriated from tramway reserves in relief of rates, making a total contribution of over £40,000. Repairs and maintenance of permanent way and cars cost over £5,000 less, but in allowances to dependents of employees £8,338 had been paid, being £5,554 more. For the trackless system the income was £8,780, representing 6½*d.* per car mile, as compared with 5¾*d.* in the previous year. The expenditure, inclusive of interest and sinking fund, amounted to £10,711, slightly less than 8*d.* per car mile, as compared with 8¼*d.* the previous year. The car mileage run on the general tramways was 5,877,000, being 317,000 less; on the railless system it was 322,000, an increase of 145,000. This increase was largely accounted for by new routes having been opened. The net profit for the whole undertaking was £29,700. The committee expressed gratification at this result and appreciation of the good work done by the management and all branches of the service. There was a diminution of £5,000 for maintenance expenditure on permanent way and cars, and renewals cost only £6,000 as compared with an average annual expenditure of between £20,000 and £25,000. A substantial deduction should be made, therefore, from the year's profits because it had been impracticable to carry out work to keep the system in its usual high state of repair, work which must be undertaken when the present difficulties with regard to labour and material disappear.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of 50 of the principal tramway undertakings in the United Kingdom, other than those in the Metropolitan area, for the week ended May 13, the latest period for which full returns are available, give total receipts of £179,992, or £7,030 more than in the corresponding week of last year. The total length of track was 2,362 miles, or 71 more than for the corresponding week. The receipts this year were at the rate of £76 4*s.* per mile of single track, and last year at the rate of £75 9*s.* 11*d.*, thus showing an increase for the week of 14*s.* 1*d.* per mile open.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. May 25.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	69¾	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	68/9	70
4%	4%	Do. 4% Deb. ...	100	91	75	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	75
5%	5%	Do. 5% Deb. ...	100	96	79	78½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	18/3xd	18/6xd
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	95½	95½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10¼	10¼
4½%	4½%	Do. 4½% Deb....	100	96	85	85
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$½	$1	Brazilian Trac. & Power Ord....	$100	66	63½	58½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	93½	93½
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	6⅞	6 13/16
2/6	2/6	Do. 5% Cum. Pref.	5	5	89/-	89/4½
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	38½	38
6%	5%	Do. Pref. Ord....	100	106	40½	39¾
5%	5%	Do. 5% Cum. Pref.	100	103	57¾	55
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	81
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	61⅞	62
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	74	72½
70/-	70/-*	Do. 7% Pref.	100	55½	46¾	46¾
—	—	Do. 6% Pref. Ord.	100	17½	16¾	16¾
—	—	Do. Def. Ord.	100	11	10	9½
5%	5%	Do. 5% Deb.	100	92	78½	78
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	67¾	68
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6xd	5 23/32xd
1/3	1/3	City of B.A. Trams.	5	5½	91/6xd	91/6xd
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	88¾	85¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11	11
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	¾	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10¾	10 1/16	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	15/32	2/4½	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	9/-	9/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	89⅞
5%	5%	Do. 5% Inc. Deb.	100	88½	79	80
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48	48
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103¾xd	103¾xd
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	72	70½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½	80½
$1½	$1½	Mexico Trams. Common ...	$100	70	26	26
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43	43
6%	6%	Do. 6% Mt. Bds.	100	76	35	35
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94	94
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92	92
1/2*	1/2*.	National Steam Car	1	15/32	15/-	16/-
9¾d.*	9¾d.*	New General Traction	1	½	7/9	7/9
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	55/-	55/-
5%	5%	Do. 5% 1st Deb.	100	89½	72xd	75xd
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	13/32	10/7½	10/7½
8d.	10d.	Provincial Trams. Ord.	1	½	17/3	17/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	87
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	90¾	90½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	79	75½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89½	89½
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	77½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	93¾	93¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	91¾	91¾
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	74	73
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Increase or Dec.
Anglo-Argentine	May 20	£53,193	£52,485	21	£1,028,646	+ £129
Auckland (28 days)	Apr. 7	20,216	20,767	40	210,704	+ 3,553
Ballarat and Bendigo	Mar. 26	3,548	3,881	52	43,724	— 2,385
Brazilian Traction Mlrs.	Mar.	6,294,910	6,711,000	13	19,220,000	+ 1,131,400
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia $	Mar.	557,135	577,117	39	4,982,147	— 772,894
Buenos Aires Lacroze	Apr. 10	41,765	40,220	43	413,102	— 8,139
Burmah Tramway ... Rs.	May 20	3,827	3,859	42	...	+ 7,640
Calcutta Rs.	,, 20	65,031	65,765	21	1,353,219	+ 83,634
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias	Apr.	1,496	2,513	18	9,930	+ 3,272
Cordoba	Mar.	12,746	13,598	52	161,906	+ 6,251
East India	Apr.	1,864	2,116	39	18,706	+ 1,466
Hong Kong $	Apr. 22	10,198	15,946	19	215,089	+ 33,012
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon Escu.	Mar.	...	175,706	13	522,600	...
Madras (2 weeks) Rs.	May 15	29,026	30,154	19	281,624	+ 24,537
Manila $	Dec.	132,500	141,350	52	1,495,534	— 108,031
Manaos	June	12,530	9,868	8	20,067	— 5,340
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Mexico $	*	...	...	...	...	...
Montevideo	Apr.	26,786	28,997	26	187,419	+ 12,764
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	Apr.	4,964	4,849	18	19,787	— 74
Shanghai $	Apr. 26	23,284	25,305	...	...	...
Singapore $	Apr. 15	11,572	13,211	15	184,326	+ 22,780
Toronto $	Mar.	820,750	910,969	13	2,663,575	+ 232,148
Winnipeg	Mar.	303,209	296,500	13	887,310	— 81,239

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare	May 16	£316	£346	+ £30	7	£2,516	+ £177
Aberdeen Corporation	,, 17	1,613	1,740	+ 127	50	89,018	+ 5,628
Accrington Corp.	,, 10	542	549	+ 7	6	3,397	+ 123
Ayr Corporation	,, 20	333	326	— 7	1	256	— 77
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 21	1,368	1,516	+ 148	7½	10,644	+ 748
Birmingham Corp.	,, 20	12,996	16,362	+ 3,365	7	116,426	+ 20,386
Do. Motor Omnibuses	,, 20	774	971	+ 197	7	6,398	+ 823
Blackburn Corp.	,, 17	1,240	1,166	— 74	7½	9,543	+ 62
Blackpool & Fleetwood.	,, 22	416	478	+ 62	20	8,246	+ 949
Blackpool Corp.	,, 18	699	844	+ 145	7	9,416	+ 2,507
Bolton Corporation	,, 21	1,711	2,934	+ 1,223	8	21,281	+ 1,718
Bournemouth Corp.	,, 24	2,648	2,264	— 384	8	17,372	— 160
Bradford Corporation	,, 20	6,346	7,015	+ 669	7	49,017	+ 543
Brighton Corporation	,, 21	1,067	1,191	+ 124	7¾	8,117	+ 546
Bristol	,, 19	9,912	9,958	+ 46	20	186,884	+ 10,264
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	,, 20	1,525	1,677	+ 152	8	13,841	+ 1,282
Burton-on-Trent Corp.	,, 21	286	265	— 21	7	1,852	— 199
Bury Corporation	,, 21	1,328	1,498	+ 170	7¾	10,641	+ 330
Cardiff Corporation	,, 13	2,625	2,764	+ 139	6	16,668	+ 983
Chatham & District	,, 18	1,129	1,240	+ 111	20	21,839	+ 1,211
Chesterfield Corp.	,, 11	250	257	+ 7	6	1,671	+ 115
Colne Corporation	,, 13	241	259	+ 18	...	...	...
Cork Electric	,, 18	497	516	+ 19	20	9,146	— 90
Croydon Corporation	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	May 20	1,046	1,156	+ 110	7½	8,052	+ 411
Dover Corporation	,, 20	301	315	+ 14	8	2,160	+ 8
Dublin & Lucan	,, 19	139	144	+ 5	20	2,356	— 259
Dublin United	,, 19	5,867	5,947	+ 80	20	106,142	— 8,567
Dundee City	,, 17	1,317	1,279	— 38	52	70,455	+ 3,902
East Ham Corporation	,, 20	1,221	1,311	+ 90	7½	9,221	— 219
Exeter Corporation	,, 19	354	375	+ 21	7	2,593	+ 34
Glasgow Corporation	,, 20	22,814	23,355	+ 541	51	1,112,076	+ 78,070
Glasgow Subway	,, 20	1,065	1,139	+ 73	20	24,616	+ 2,783
Glossop (U. Elec. Supp.)	,, 20	126	140	+ 14	21	2,765	+ 386
Halifax Corporation	,, 16	2,083	2,072	— 11	6½	14,772	+ 33
Do. Motor Omnibuses	,, 16	47	42	— 5	6½	293	— 45
Hastings & District	,, 19	864	974	+ 110	20	16,236	+ 453
Huddersfield Corp.	,, 20	2,525	2,896	+ 371	7	20,694	+ 2,461
Hull Corporation	,, 20	3,082	3,131	+ 49	7	21,899	— 815
Ilford U.D.C.	,, 20	632	691	+ 59	7	4,944	+ 461
Ilkeston Corporation	,, 25	124	144	+ 20	8	1,057	+ 39
Ipswich Corporation	,, 20	512	511	— 1	7	3,440	+ 280
Isle of Thanet	,, 20	457	340	— 117	33	8,756	— 1,415
Kilmarnock Corp.	,, 20	170	122	— 48	1	122	— 48
Lanarkshire	,, 18	2,001	2,184	+ 183	20	43,020	+ 7,103
Lancashire United	,, 17	1,703	1,696	— 7	20	33,015	+ 1,806
Leeds City	,, 22	8,736	9,772	+ 1,036	8	69,365	+ 8,107
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	,, 20	577	627	+ 50	8	627	+ 50
Leyton U.D.C.	,, 18	1,683	1,553	— 130	7	11,181	— 329
Liverpool Corporation	,, 20	13,402	14,125	+ 723	20½	270,115	+ 13,823
Llandudno & Colwyn B.	,, 19	317	294	— 23	24½	5,450	— 226
London County Council	,, 3	50,155	46,931	— 3,224	4½	222,743	— 10,033
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	,, 20	160	132	— 28	32½	4,231	— 1,220
Maidstone Corporation	,, 18	197	206	+ 9	7	1,562	+ 10
Manchester Corp.	,, 20	17,759	18,559	+ 800	7	132,715	+ 7,628
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	Apr. 22	169	269	+ 100	3½	737	+ 62
N'castle-on-Tyne Corp.	May 20	6,322	6,488	+ 166	7	44,031	+ 968
Newport (Mon.) Corp.	,, 20	835	944	+ 109	7	6,502	+ 1,317
New St. Helens & Dist.	,, 17	895	902	+ 7	46	45,639	+ 3,341
Northampton Corp.	,, 19	731	680	— 51	7	4,859	— 331
Nottingham Corp.	,, 18	3,454	3,777	+ 323	7	26,186	+ 1,070
Oldham Corporation	,, 21	2,387	2,615	+ 228	8	20,519	+ 1,236
Portsmouth Corp.	,, 20	2,474	2,678	+ 204	8	19,023	...
Preston Corporation	,, 17	898	1,044	+ 146	6½	7,193	+ 680
Provincial	,, 23	2,182	2,397	+ 215	33	69,706	+ 4,514
Reading Corporation	,, 18	748	794	+ 46	6½	5,530	+ 426
Rhondda Tramways	,, 3	1,169	1,258	+ 89	18	21,372	+ 1,248
Rochdale Corporation	,, 20	1,682	1,747	+ 65	7½	13,161	+ 574
Rotherham Corp.	,, 24	1,483	1,434	— 49	7¾	10,782	+ 2,203
Salford Corporation	,, 22	5,510	5,758	+ 248	7¾	40,261	+ 2,575
Sheffield Corporation	,, 21	8,650	10,672	+ 2,022	8	82,268	+ 14,251
Southampton Corp.	,, 17	1,409	1,491	+ 82	6½	10,289	+ 590
Southend-on-Sea Corp.	,, 17	759	705	— 54	7	5,127	— 559
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 18	735	735	nil	6½	4,818	+ 258
Sunderland Corp.	,, 21	1,460	1,612	+ 152	7	11,202	+ 443
Sunderland District	,, 17	559	541	— 18	29	16,532	+ 1,009
Swindon Corporation	,, 17	192	189	— 3	6½	1,315	+ 53
Torquay Tramways	,, 11	581	518	— 64	19	8,737	— 16
Tyneside Trys. & Tmrds.	,, 17	613	546	— 67	20	10,130	— 428
Wallasey Corporation	,, 20	1,220	1,301	+ 81	7½	9,359	+ 446
Walsall Corporation	,, 20	717	813	+ 96	21	15,952	+ 2,211
Walthamstow U.D.C.	,, 20	842	1,067	+ 225	7	7,489	+ 1,373
Warrington Corp.	Apr. 27	420	525	+ 105	4	1,911	+ 245
West Ham Corporation	May 18	2,932	3,191	+ 259	6½	22,115	+ 934
Wigan Corporation	,, 18	1,583	1,616	+ 33	7	11,353	+ 612
Wolverhampton Corp.	,, 24	1,580	1,241	— 339	8	9,393	+ 653
Yorkshire (W. Riding)	,, 21	1,583	1,736	+ 153	21	34,851	+ 3,639

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879, CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 28.] LONDON, SATURDAY, JUNE 3, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

DUBLIN CORPORATION.

COAL.

The Corporation of Dublin invite Tenders for the Supply of Coal for the purposes of their Electricity Works and Main Drainage Pumping Station, for a period of One, Two, or Three Years from June 30, 1916, a Twelve Months' supply being approximately 40,000 tons.

Tenderers may submit offers for one-half the above quantity of 40,000 tons—i.e., 20,000—for delivery as required throughout the year, and at one-half the above rates per week, all the other conditions remaining the same. The Coal is to be of the Best Washed Single Nuts from Scotch Colliers, delivered alongside the Wharf at the Pigeon House, Dublin.

Tenderers may, however, submit Alternative Tenders for other classes of Scotch, English, Welsh, or Irish Coal which will comply with Clause 6 of the Specification.

No Tender will be considered unless it is furnished on the printed form, nor will any Tender in which any alteration of the form has been made, and no Tender can be withdrawn within three months from delivery.

Copies of the Specification (price Five Shillings each) can be obtained from the Town Clerk, City Hall, Dublin, and Tenders must be sent in not later than Thursday, June 8, 1916, marked "Tender for Coal for Electricity Works," and addressed to "The Chairman of the Supplies Committee, The Town Clerk's Office, City Hall, Dublin."

The Corporation does not bind itself to accept the lowest or any Tender. By order,

Town Clerk's Office, City Hall, Dublin, May 25, 1916. HENRY CAMPBELL, Town Clerk.

COUNTY BOROUGH OF WALLASEY.

TRAMWAYS DEPARTMENT.

CONTRACT FOR STORES.

The Wallasey Corporation are prepared to receive Tenders for the supply, over a period of twelve months, from July 1 next, of the following Stores, to be delivered at the Tramway Depôt, Seaview Road, Wallasey, viz.:—

Chilled Iron and Steel Tired Car Wheels.
Steel Gears and Pinions.
Steel Axles.
Brake Blocks.
Trolley Heads.
Armature, Axle Box, and Motor Suspension Bearings.
Check plates.
Cotton Cleaning Cloths and White Cotton Waste.
Axle Grease.
Lubricating and Cleaning and Paraffin Oils.

Further particulars, with forms of Tender, may be had, and samples inspected, on application to the Tramways General Manager, at his office, Seaview Road, Wallasey.

Sealed Tenders, which must be on the printed form, endorsed "Tender for Tramway Stores" and addressed to the undersigned, to be delivered per post at my office, as below, not later than the morning of June 10 next.

The Corporation reserve the right to accept the whole or part of a Tender, and do not bind themselves to accept the lowest or any Tender.

Town Hall, Wallasey, May 25, 1916. (By order) H. W. COOK, Town Clerk.

MATLOCK URBAN DISTRICT COUNCIL.

TRAMWAY CABLE.

The above Council are prepared to receive Tenders for about 1967 Lineal Yards of Patent Steel Wire Tramway Cable, 3⅛in. in circumference, with Manilla Core, delivered at their Depôt, Matlock, carriage paid.

Particulars, specifications, and terms as to payment, may be obtained from Mr. John D. Evans, Tramway Manager.

Tenders, to be accompanied by samples of wires, to be delivered at my office (marked "Cable") not later than 12 noon on Saturday, June 10, 1916.

The Council do not bind themselves to accept the lowest or any Tender.

Town Hall, Matlock, May 24, 1916. R. TAYLOR, Clerk to the Council.

POSITIONS VACANT.

COUNTY BOROUGH OF EASTBOURNE.

ELECTRICITY DEPARTMENT.

MAINS ENGINEER.

The Electricity Committee invite applications for the position of Mains Engineer at a salary of £156 per annum. The appointment will be permanent, subject to a month's notice on either side.

Applicants must have had a sound mechanical and electrical engineering training and must have had experience with a system employing single-phase high and low tension mains distribution.

Applications, written on foolscap, stating age, whether married or single, and giving full particulars of training and experience with dates in chronological order, accompanied by copies of not more than three recent testimonials and endorsed "Mains Engineer," to be sent by post only to the undersigned not later than 5 p.m. on Friday, June 9, 1916.

J. K. BRYDGES, Borough Electrical Engineer.

Electricity Works, Eastbourne. May 18, 1916.

SWITCHBOARD ATTENDANT.

Switchboard Attendant required for combined three-wire lighting and traction supply station. Experience in three-phase generation a recommendation but not essential. Wages 35s. per week, rising yearly 2s. 6d. per week to 40s. Only applications from persons whose present employers are willing to release them will be considered.—Write stating age, experience, and enclose copies of not more than two recent testimonials to Mr. G. R. Spurr, Electrical and Tramways Engineer, Priory Avenue, Walthamstow.

ASSISTANT ENGINEER.

Junior Assistant Engineer, ineligible for military service, required immediately for shift work in alternating current single-phase h.t. station; wages 38s. per week, plus war bonus of 2s. per week. —Applications, giving particulars of experience and age, with copies of testimonials, to "Chief Engineer," Electricity Works, Corporation of Wimbledon.

FOREMAN OVERHEAD LINESMAN.

Foreman Overhead Linesman required; ineligible for service. Full particulars as to past experience; and wages required, to Engineer, Corporation Tramways, Portsmouth.

SHIFT ENGINEER.

Shift Engineer required; ineligible for service. Wages 40s. to 45s. per week, according to qualifications.

Applications with full particulars to Engineer, Corporation Tramways, Portsmouth.

Digitized by Google

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.

Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3483 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS' SUPERFINE PAINTS
and
EXTRA DURABLE VARNISHES
for
TRAMCARS.

DOCKERS' "HERMATOR" PAINTS AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.
The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:
FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.
FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JUNE 3, 1916.

THE FUTURE OF WOMEN CONDUCTORS.

An absurd charge against the tramway authorities of Birmingham and district was brought forward by one of the delegates at the annual conference of tramway workers held at Sheffield. Alleging that officials had stated that they are not going to employ men as conductors again, the delegate asserted that the future position of the men was menaced by the women. The incident illustrates a recent development of trade unionists. Their actions seem to be based upon expediency rather than principle, with the result that agreements are lightly cast aside. Men with minds so attuned are apt to view their employers in a similar light. Hence it is not surprising to find sweeping charges brought against public authorities and companies. No doubt if the delegate's assertion had been probed to its source it would be found to have arisen from a jocular remark by some minor official. That it has no support in the intentions of those responsible for the conduct of the Birmingham Corporation Tramways is shown by the repudiation given to it by the chairman and general manager. Months ago tramway authorities began to fulfil their promises by reinstating invalided men if they are physically fit for the work, or by finding them other positions in municipal employ. As Councillor Harrison Barrow observed, it is not possible to say definitely that all female labour will be withdrawn when hostilities cease, for no one can predict what labour conditions will be in the future. In this connection vehicle workers' unions will be faced by the consideration that they have accepted women as members, and it will be impossible to expel them. The probability is that in tramway work there will for some time be a shortage of men, so that the continued employment of women will be necessary. It is not unlikely, however, that physical incapacity to stand the strain of conductors' work will bring about the retirement of the majority of the women now employed. Tramway authorities will then be faced with the necessity of deciding whether women shall continue to be employed in view of the disadvantages of lack of stamina, their not being so readily trained as men, and the cost of their clothing being nearly double. The last two considerations have been advanced by the general manager at Leeds, and we have reason to believe that experience in London has revealed other disadvantages. From an unofficial source we learn that the average earnings of the cars show decreases, due to the inability of women to gather in all the fares, especially from persons who make a practice of over-riding distances on return journeys. That this offence is rife is shown by the experience of men conductors when given duty in "car jumping" owing to cars being under repair or laid by for lack of motormen. The question of health is another matter that needs most careful supervision, and it would be wise for authorities employing their own medical advisers to call for careful records to be kept. Judging by fatal and non-fatal accidents that have occurred to women conductors, there is room for improving their training as regards safety precautions. Unless they are made to realise thoroughly the need for caution in their own movements, they will fail to appreciate the responsibility that rests upon them for securing the safety of passengers.

TRAMWAYS AND LIGHT RAILWAYS CONGRESS.

At the nineteenth ordinary general meeting of the Tramways and Light Railways Association, which will be held at 2.30 p.m. Friday, June 30, at the Westminster Palace Hotel, Victoria Street, S.W., the Council will present their report and accounts for the year ended December 31 last. The election of the following members will be proposed to fill vacancies on the Council created by the retirement of Messrs. C. Shirreff Hilton, J. W. Dugdale, H. L. Williams, S. E. Baker, T. B. Goodyer and J. Cameron under the articles of Association:—Mr. A. H. Beatty (Balfour, Beatty and Co.); Mr. I. Bulfin (general manager, Bournemouth Corporation Tramways); Mr. W. Vincent Edwards (general manager, Hastings and District Tramways Company); Mr. G. M. Harriss (general manager, Dublin United Tramways Company); Mr. H. M. Sayers (consulting engineer); and Mr. A. W. A. Chivers, British Electrical Federation, Ltd. Mr. A. W. Chambers, the retiring hon. auditor, offers himself for re-election.

After the transaction of the routine business, Mr. W. T. Robson (general manager of the Southampton Corporation Tramways) will read a paper entitled "Tramway Transit and Comfort; a Plea for the Passenger." The members will subsequently be conveyed to the London General Omnibus Company's training school at Milman Street, Chelsea, where they will be received by the operating manager, Mr. H. E. Blain. After an inspection, Mr. Blain will give an address on "The Safety Movement." At the annual dinner, to be held at 7.30 p.m. at the Trocadero Restaurant, the Hon. Arthur Stanley, M.P., will preside. Members are asked to notify the secretary at an early date how many tickets they will require for themselves and friends.

INTERCONNECTION OF POWER STATIONS.

The Railway Department of the Board of Trade have sent the following communication to electric supply undertakings:—

"The Central Coal and Coke Supplies Committee have had under consideration the increasing difficulty in providing for the supply of coal to important consumers, and have advised the Board of Trade that in view of the possibility of a serious shortage in the near future every practicable economy in consumption should be adopted without delay. In this connection the Board desire to call attention to the very considerable saving that can be effected by the adoption of arrangements for interconnection and joint working of electric supply undertakings, including interconnection with stations supplying tramways and railways. The Board are aware of the difficulties involved at the present time, particularly in regard to labour and materials, but they are advised that in many cases the necessary arrangements could be made at once, and they wish therefore to urge upon electric supply undertakers the necessity in the national interest of taking immediate steps to avail themselves to the fullest possible extent of the powers which exist for the purpose. Any application which may be made to the Board of Trade for their approval of such arrangements under the powers conferred on them by the Electric Lighting Act, 1909 (Section 4, sub-section 3), and the London Electric Supply Acts, 1908 and 1910, will receive their immediate attention. The Board are prepared to assist as far as possible in cases where difficulty is experienced in securing the agreement of all the parties interested in any proposed scheme or in arranging the terms and conditions under which it shall be carried out."

Before the issue of the letter a scheme on similar lines for Lancashire and Cheshire had already been taken up by the Municipal Electrical Association of those counties, as the result of a suggestion made by Mr. J. A. Robertson, the electrical engineer to Salford Corporation, and a committee are now collecting data. The chairman is Mr. S. L. Pearce (Manchester), and the other members are Messrs. B. Welbourn (Prescot Electric Light Co.), J. A. Robertson (Salford), hon. secretary, C. C. Aitchison (Rochdale), S. E. Britton (Chester), H. Dickinson (Liverpool), E. H. Edwards (South Lancashire Tramways Co.), R. Blackmore (Stalybridge), J. Purrett (Lancashire Electric Power Co.), S. J. Watson (Bury), P. P. Wheelwright (Blackburn), and J. A. F. Aspinall (general manager, Lancashire and Yorkshire Railway).

Digitized by Google

APPLICATIONS TO THE TRIBUNALS.

Application was made at Torquay by Mr. H. J. Nisbett, manager of the Tramways Company, for the exemption of the chief clerk and an electrical fitter. The chief clerk was allowed until September before entering the army, and conditional exemption was granted to the other man.

Exemption from military service until August 1 has been granted to the foreman of the tramways depôt at Ramsbottom, Lancashire. It was stated that the service would stop if the applicant had to go.

Mr. C. L. Stewart, general manager and electrical engineer, Rawtenstall Tramways and Electricity department, secured exemption for a switchboard attendant.

On the ground that he was indispensable in a certified occupation, exemption has been obtained for a married motorman, employed on the Cheltenham Light Railways, by Mr. H. J. McCormick, the engineer and manager.

Southend Light Railways Committee have agreed not to proceed with the proposal to use women as drivers, but have requested Mr. R. Birkett, the manager and electrical engineer, to apply for the postponement of the calling up or the provisional exemption of 17 motormen who attested under the Derby scheme.

On behalf of the Rhondda Tramways Company, Mr. H. Holliday, the manager and engineer, obtained the conditional exemption of two clerks. He mentioned that over 100 per cent. of the employees had enlisted. The company had considered the question of appointing women drivers, but owing to the difficult nature of the track they had to abandon the idea. They employed about 70 women conductors at the same salaries as males, and there were also women car cleaners, while a woman was acting as blacksmith's striker. She was doing better than the women clerks.

At Wallasey, Colonel R. R. Greene, the tramways manager, asked for the exemption of twenty-six motormen, all of whom were in a reserved class and cannot be taken without the manager's consent. The military representative said he would ask for some of the men, even if it involved some inconvenience to the tramways. Colonel Greene replied that they were already ten men short for the present inadequate service, and if more men were taken the service would have to be reduced. They were twenty men short for the usual service. Nineteen drivers and sixty-two conductors were serving with the colours. The only male conductors remaining were either over military age, or had been rejected or were discharged from the Army. The traffic was greater than last year, but if he found it possible to spare another man he would do so. Exemption was granted so long as the men remained in their present occupations.

TRACTION EMPLOYEES AND WAR WORK.

At a meeting of Glasgow Corporation on May 25, the chairman of the Tramways Committee was asked if 300 car cleaners at Dalmarnock depôt had been dismissed to make room for female cleaners, and if the management proposed to follow the same course in other depôts? He was also asked if men between 41 and 60 years of age were being asked to apply at Stewart & Lloyds for other work. Councillor Montgomery, in reply, read the notice posted at the depôts. This was to the effect that certain male car cleaners would be dispensed with, and that their names had been handed to the various Labour Exchanges. The men were asked to report at once so that arrangements might be made for placing them in munition works. Those who had no prospect of employment by a certain date were requested to report to their foreman or the manager. This was purely a war expedient, and only those physically fit for war work were being asked to leave the service, and all of them would be taken back after the war. Councillor Charleton complained that the matter had not been discussed by the Tramways Committee, but the chairman replied that he could not delay the proposal, as it was urgent for national reasons.

Mr. R. H. Selbie, the general manager of the Metropolitan Railway, has issued an appeal to those of the staff, men and women alike, who are only too ready to do their bit in the war, although left at home. The choice of the assistance to be given includes munition work at the company's munition factory and elsewhere, the formation of a hospital entertaining party, a Red Cross society, a women's work scheme, and the cultivation of a market garden on the company's ground at Wembley Park, in order to supply vegetables to military hospitals. The body of workers is to be known as the Metropolitan Railway War Service Corps.

In response to an appeal by the Minister of Munitions, the various trade unions are asking their members who are engaged in national work not to take holidays at Whitsuntide, in order that the manufacture of munitions, etc., may not be interfered with. It is stated that the Easter holidays made a shortage of 50 per cent. in the supply of shells and lessened the construction of guns and ships.

The women employed on the Newcastle Corporation Tramways have formed a committee to provide comforts for wounded soldiers in the local hospitals. The women are subscribing one penny per week each, and collections are also made at the depôts. Gifts are also received from the public.

THE EMPLOYMENT OF WOMEN.

A denial has been given to the assertion, made by a Birmingham delegate at the Tramway and Vehicle Workers' Association's annual conference at Sheffield, that the superintendent of one district in Birmingham had declared that he would have no more men as conductors. Councillor Harrison Barrow, chairman of Birmingham Tramways Committee, said the Committee intended to fulfil their promise that the positions of all conductors serving with the colours would be open to them upon their return. It was, however, impossible to say definitely that all women would be withdrawn when the war ended; no one could predict what labour conditions would be in the future. Mr. Alfred Baker has stated that there is not the slightest truth in the assertion, and that the positions would be kept open for men who had gone to the front.

The question of the trade union for women conductors was touched upon by Mr. N. Bradwell, of Sheffield, in his address as president of the Amalgamated Association of Tramway and Vehicle Workers. He remarked that last year the conference passed an exceedingly hostile resolution. It was left to the individual branches to enforce that resolution, and he thought it was to the honour of the association that the branches had taken the women into their association. It was made clear that there was an insufficiency of men, and it was their duty to help the country in the present crisis. Over 7,000 of their own members had been released for the army. When the question came up the secretary wrote to the Union of Women Workers, suggesting that that body enrol the women as members, and the reply received was that the Women's Union by its rules could not accept as members those engaged in a trade which already had its Union. He could wish that all unions sent such replies in connection with their work.

In reporting on the work of the women conductors at Leeds during the portion of the past financial year in which they have been employed, Mr. J. B. Hamilton has stated that, "taking all things into consideration, they are doing very well." They now number over 400, and before the summer ends the number of male conductors will not exceed fifty. These men are ineligible for any form of military service.

Oldham Tramways Committee, in providing additional accommodation for women conductors at Wallshaw depôt, have agreed to furnish a recreation room for them. As a corollary, there was proposed a new regulation that the women should not be allowed to become members of the men's recreation room.

In the event of the manager being unable to secure men to fill the vacancies caused by conductors being called up for military service, the Tramways Committee of East Ham have authorised the employment of women.

UNDERGROUND AND L.G.O. GROUP.

OPERATING DATA.

At the monthly efficiency meeting of the operating department of the Underground Railways and London General Omnibus Group, held at the L.G.O.C. Training School, Milman Street, Chelsea, S.W., a paper on "The Graphic Presentation of Operating Data" was read by Mr. H. E. Beech, of the L.G.O.C. General Superintendent's Department.

The Chair was occupied by Mr. H. E. Blain, the operating manager, who observed that the past two years had been noticeable for the very great improvement which had been effected in the graphs and diagrams used in the department, which had enabled the huge mass of operating data to be presented in a form at once easy to comprehend and clear in exposition.

Mr. Beech's paper was illustrated by a large number of slides, commencing with some of the striking posters which have been utilised to show the various speed rates of different types of vehicles used in London transit. The subject was divided into sections:—(1) curves; (2) vertical diagrams; (3) describers; (4) other graphical methods. Included in the first group were examples of omnibus loading diagrams, charts showing mess room operations, the movement of employees at Woolwich Arsenal with the traffic facilities afforded, quarterly route averages in successive years and progressive averages on new routes; rotary railway charts, omnibus petrol consumption charts and train and omnibus declaration curves.

Group No. 2 included traffic analysis loading diagrams of several descriptions, accident diagrams, diagrams showing journeys per head of population of large cities and comparison of rapid transit facilities. Group No. 3 showed some novel forms of describers which had been perfected for such work as the allocation of vehicles from a large number of garages to different routes. Group No. 4 included several different types of diagrams for plotting and checking headways, graphs showing comparison of vehicles used in different years, combined cartoons showing routes geographically with loadings on omnibus and railway facilities in the area, etc. The actual forms from which the illustrations had been prepared were laid out as exhibits, and both their inspection and criticism evoked considerable interest.

The next meeting of the series will deal with the subject "Time-Tables and Duty Sheets—comments and criticisms on methods and practice."

WAR OFFICE AND THE L.G.O.C.

In the House of Commons on May 30, on the order for the third reading of the Consolidated Fund (No. 3) Bill, Mr. Ashley (Blackpool), in calling attention to War Office administration, said that he had been taken to task for his statement about the London General Omnibus Company, but as far as his information went what he said was perfectly true. The proposal made by the company to the War Office at the beginning of the war was, he was told, refused by the Financial Department of the War Office, though it was backed by the Quartermaster-General's Department. The result was that the Government had paid from £600,000 to £750,000, where they might only have paid £170,000 or £200,000.

Mr. H. W. Forster (Under Secretary) replied that Mr. Ashley's information was not altogether accurate. The question whether the London General Omnibus Company's business should be taken over by the Government as the railways had been, was thoroughly considered, as was necessary, seeing that a cost of between £1,000,000

Digitized by Google

and £1,500,000 was contemplated by those who recommended that course. The Quartermaster-General, the then Financial Secretary, and other officials concerned unanimously recommended the arrangement which had been adopted.

We may add that the Government have an arrangement with the company for the use of their vehicles and drivers whenever they may be required by the military authorities in an emergency. The vehicles have been used for the transport of Belgian refugees and in conveying aliens to the camps in the London district. On the occasion of the sudden decision to send a naval landing detachment to take part in the defence of Antwerp, the company at a few hours' notice supplied a large number of omnibuses with drivers fully equipped, when invaluable service was rendered in transporting troops to that city and also during the withdrawal.

L.C.C. TRAMWAY MATTERS.

A meeting of the London County Council was held on Tuesday last, when the following business was transacted relating to the tramways.

THE CONCILIATION BOARDS.

The Highways Committee reported that the four existing conciliation boards in connection with the tramways were constituted in June, 1913, so that the term of office expired in June, 1916. Having regard to the shortage of staff, the necessity for economy, and to the fact that a large number of employees were serving in the forces of the Crown, the Board of Trade and the employees' representatives had, at the suggestion of the Highways Committee, agreed to the existing Boards continuing to hold office until six months after the termination of the war. This is subject to the existing scheme remaining in force until the expiration of that period.

LARGE INCREASE OF TRAILERS AND WOMEN CONDUCTORS.

Mr. J. D. Gilbert asked the Highways Committee: (1) what is the number of trailer cars in use on the tramways, and on what routes are they running: (2) what is the number of women now employed as conductors; (3) whether any women so employed are the widows or wives of men who have been killed or injured during the war; (4) is any preference given to such women; if not, will the Committee consider as to these women having preference in employment whenever possible?

Mr. G. H. Hume (chairman of the Highways Committee) replied (1) 116 trailers are in use on the following routes: Merton, Norbury, New Cross, and Eltham—Beresford Square, Woolwich; (2) 739; (3) Yes; (4) As the hon. member is no doubt aware, careful inquiry is made into the position of widows and dependents of employees killed in war service, by the Soldiers' and Sailors' Care Sub-Committee of the General Purposes Committee, as well as by the tramways department in the case of men serving in that department, in order to ascertain whether employment in any branch of the Council's service can be found for them.

MISCELLANEOUS NEWS AND NOTES.

Montreal and Southern Counties Electric Railway has commenced a regular schedule between Montreal and Granby. Express trains make the distance in two hours, while local trains do it in two hours and forty minutes.

The Union Conference.—During the annual conference of the Amalgamated Association of Tramway and Vehicle Workers at Sheffield the delegates were given facilities for a tour in the motor omnibuses of the Tramways Department. They also inspected the Shoreham Street depôt.

Controlled Establishments.—The Minister of Munitions announces that he has made further orders under the Munitions of War Acts, 1915-16, under which 131 additional establishments have been declared "controlled" establishments. The total number of controlled establishments is now 3,577.

Woolwich Transit Facilities.—A department has been formed at the Woolwich Arsenal to supervise all matters relating to the welfare of the employees, especially the younger ones. The health of the workers, housing accommodation, transit facilities, and canteens are amongst the matters to be controlled.

Lay-By in West India Dock Road.—The construction of a lay-by to the London County Council tramways in West India Dock Road having rendered unnecessary the crossover immediately west of Burdett Road, the crossover is to be taken up and installed near the west end of Commercial Road, at a cost of £350.

Extensions of Generating Plant.—The following applications are being made for sanction to the borrowing of loans for the extension of generating station plant:—Stalybridge Tramways and Electricity Board, £39,000; Stoke-on-Trent Council, £33,000; Wolverhampton Council, £17,160; Walthamstow Council, £11,240.

A Shelter to Save the Cost of a Car.—By erecting a shelter for passengers at the junction of Warren Drive and Grove Road, New Brighton, the Wallasey Tramways Committee hope to save £800 per annum. That amount is the cost of running an extra waiting car for the convenience of passengers who transfer to and from the Warren Drive and Wallasey Village cars at this point.

Time Recorder for Regulating Car Services.—Mr. A. Wilkie, general manager, Aberdeen Suburban Tramways Company, has introduced a time recorder on the Deeside route, near the Bieldside terminus. It is operated by each conductor having to insert a key in outer and inner keyholes, thus giving a printed record of the time his car passes for comparison with the scheduled times.

Spanish Electrification Scheme.—A proposal has been made to electrify the railway between Madrid and Valencia, thus enabling the journey to be accomplished in five hours. The terminus at Madrid would be placed underground. Provided the scheme is included among the secondary and strategic lines now under consideration, the work of electrification is expected to be started within a year, but six years will elapse before it is completed.

Omnibus Restriction in Croydon.—Under the Local Government (Emergency Powers) Act, the Croydon Corporation have passed the following resolution:—"The use by any omnibus of any route that has not been used within two years prior to March 1, 1916, without the consent of the Corporation, or if unreasonably withheld, of the Local Government Board, is forbidden under penalties."

Third Stoppage of Birmingham Tramway Traffic.—At 9.25 a.m. on May 29 the whole of the services at Birmingham with the exception of that portion on the Aston and Erdington side of the city which is electrically controlled from the Aston generating station, came to a standstill until 9.45 a.m. The cars were restarted only to stop again for a longer period a short time later. The cutting off of the supply of energy was due to the great demands upon the Electric Supply Department, especially by munition works. Owing to the low grade of the fuel at the generating station, more boilers have to be utilised than would be the case if better quality coal could be obtained. The result is that the steam pressure fails, and on this occasion there were no spare boilers available. Consequently the supply to the tramways had to be temporarily suspended. This is the third occurrence of the kind in seven months. As far as is practicable the plant is being increased to meet the demands.

Heavy Increased Prices in Canada.—One of the largest electrical manufacturing firms in Canada has issued a circular stating that higher prices are inevitable. The increases are due primarily to the increased cost of raw materials, the scarcity of labour and the present embargo on shipments from Europe, which renders them dependent on receiving supplies from the United States, where the rise in prices during the past year has been unprecedented. The following figures are given as an indication of the increases in that country from March, 1915, to March, 1916:—Copper, 100 per cent.; pig iron, 60 per cent.; tool steel, 600 per cent.; steel castings, 33 per cent.; forging billets, 150 per cent.; insulating materials, varnished cambric, and mica sheets, 35 per cent.; steel plates, 300 per cent.; electric steel, 150 per cent.; tin, 50 per cent.; lead, 150 per cent.; brass, 200 per cent.; spelter, 300 per cent.; cold rolled steel, 220 per cent.; ferro-manganese, 1,000 per cent. Delivery of bars and plates which a few months ago could be secured in thirty to sixty days now takes from nine to ten months. Copper which could be secured in thirty days now requires four months, and shipping promises on cold rolled steel run well into 1917, and such orders must be entered without cancellation privileges.

Employees' Conditions of Labour and Pay.—Bradford Tramways Committee have instructed the general manager to report on the conditions of labour in the department. The dispute between Wolverhampton tramway and other municipal employees and the Corporation respecting the payment of a war bonus is to be submitted to arbitration before the War Production Committee. The Council's original offer was for an additional bonus of 2*s.* to men with three dependent children, providing it did not raise the wages above 40*s.* per week. Subsequently this was amended to 1*s.* for the first child and 6*d.* per child after, but this also was rejected. Halifax Council have approved of the following scale of wages recommended by the Tramways Committee after considering an application for a revision of the conditions of service:—On appointment, conductors 5½*d.* per hour, motormen 6*d.*; after six months' satisfactory service, conductors 6*d.*, motormen 6½*d.*; after twelve months conductors 6½*d.*, motormen 7*d.*; after seven years, conductors 6¾*d.*, motormen 7½*d.*, and that no alteration be made in the present war bonus. Huddersfield tramwaymen applied for an additional war bonus of 4*s.* each per week. The Corporation have confirmed the decision of the Tramways Committee to pay an additional war bonus of 2*s.* per week subject to the men consenting to the employment of youths as car cleaners. Ramsbottom Railless Traction Committee have refused to increase the wages paid to the drivers. It is contended that the wages now paid are equal to those given to the employees of small tramway undertakings.

Where Fares Have Risen During the War.—Reporting to Bradford Tramways Committee on a proposal to lengthen penny stages, Mr. C. J. Spencer, the general manager, says:—"The proposal to cheapen fares at the present moment is, in my opinion, very inadvisable, though I agree that under normal circumstances the proposition is in the right direction. I have made inquiries from seventy-eight towns as to alterations in fare stages since the beginning of the war, and I find that in twelve towns, including Birmingham, fares have been increased since the war started. In sixty-six towns no alteration has been made, and only in one case has any decrease in fares taken place. It would be difficult to find a commodity of any description which has not increased in price, let alone decreased, since the outbreak of war. The cost of operation of tramways has increased considerably, and gives every indication of still further increase in the future." Mr. Spencer also stated that "the total cost of operation per car mile, including interest and sinking fund, for the year just closed, amounted to 11.905*d.* Taking the last five years of peace, ended March 31, 1914, the receipts per car mile averaged 11.439*d.*, which was .466*d.* per car mile less than the expenses for the year just closed. If the receipts of war time had been the same per car mile as the average of the previous five years in peace time there would have been a loss of nearly ½*d.* per car mile on every mile run during the year, so that if the receipts per car mile in the war period had not been in excess of the receipts in peace the undertaking would have shown a loss of £12,900. The extension of the penny fare stages under present conditions would result in a considerable loss of revenue, unless it were possible to put on additional cars to meet the extra traffic attracted. Under present conditions it would be impossible to provide cars, so that two things would inevitably happen—viz.: (1) a reduction in receipts, and (2) a still further overcrowding of cars." The Committee adopted the report.

Digitized by Google

PERSONAL.

Councillor Kensett has been appointed chairman of West Ham Corporation Tramways Committee.

The Belfast Managership.—The sub-committee appointed by the Tramways Committee to consider the applications for the appointment of general manager are now obtaining further information regarding six candidates whom they have selected.

Mr. D. Hazel, a member of the Highways Committee, London County Council, has been appointed a member of the Traffic Conciliation Board so long as he remains a member of the Council, in the place of Mr. Cyril Jackson, who has resigned his membership of the Council.

Mr. A. R. Owen, tramways and marine claims superintendent in the tramways department of the London County Council, has been employed on work under the Admiralty since the outbreak of the war. The Council on May 30 approved of the grant of leave of absence to the officer without pay and on the conditions reported on May 11, 1915.

Mr. J. J. Hill, the American railroad magnate, who began life as a wharf labourer, died on May 28 in his seventy-eighth year, after having undergone an operation on the preceding day.

Major N. C. Pilcher, of the Canadian Mounted Rifles, brother of Mr. R. S. Pilcher, manager of the Aberdeen Corporation Tramways, was killed in action on May 26. Major N. C. Pilcher came over with the Canadian Expeditionary Force nearly a year ago. He volunteered for overseas service when war broke out. He was through the whole of the South African campaign, and has been connected with the Canadian Militia for many years. In civil life he was general manager of the Sherbrook Electric and Street Railway Company, Sherbrook, Province of Quebec, Canada. He leaves a wife and one child.

CONTRACTS AND ORDERS.

Shepherd's Parging Block Company, Ltd., of Milkstone, Rochdale, write that among recent users are included the Dunfermline, the Scarborough, and the East Ham Corporation Tramways, and the Midland Railway Company. Sixth and seventh repeat orders from various customers are being supplied, and there is very satisfactory evidence of the economy which can be obtained from the use of the Company's block parging.

Portsmouth Council have accepted the following tenders for the supply of uniforms for the women tramcar conductors:—J. Canton and Co., London, clothing; C. Dillingham and Son, Luton, caps; Beng Bros., Portsea, caps.

FINANCIAL REPORTS AND MEETINGS.

Delhi Electric Tramways and Lighting Company.—The revenue for 1915 was £10,300, and the surplus for appropriation £6,113, which has been applied as follows:—In writing off preliminary expenses, £2,217; transfer to depreciation reserve account, £2,000; to renewals reserve account, £1,000; carried forward, £895.

Record Annual Receipts at Dundee.—For the year that ended on May 15 the receipts of the Dundee Corporation Tramways amounted to £70,455, an increase of £3,902. This is a record. Expenditure, however, has correspondingly risen, the cost of electricity showing an addition of £1,000, while wages and war allowances are up by £2,000.

L.C.C. Tramway Receipts.—The traffic receipts during the two weeks ended May 17 were £92,752, an increase of £19,401, as compared with the corresponding weeks of last year. The second week of the latter period was during the time of the tramway employees' strike. Passengers numbered 22,170,129, an increase of 4,860,284. From April 1, 1916, the total receipts were £315,496, an increase of £9,369 on the aggregate for the corresponding period of 1915. The route mileage was 141.21.

A Year's War Traffic at Southampton.—The receipts of the Corporation tramways for the year ended March 31 totalled £78,064, or £10,022 more than for the previous year. The number of passengers rose by 2,228,651, although the car mileage decreased by 66,929. A decrease of 4,499 units was recorded in the energy used. In the receipts there was an increase of 1.862*d.* per car mile, while the cost of energy per car mile increased by .045*d.* The general manager advises that a charge should be made for parcels, other than luggage, exceeding 28lbs.

More Records at Glasgow.—The receipts on the Glasgow Corporation Tramways on Saturday, May 20, were unprecedented for a single day in the history of the department, the sum received being £5,176. The previous record for a day was on the International Football Saturday in April, 1914, when £5,075 was drawn, but in June last a fine Saturday brought in £5,010. The receipts for the week ended May 20 were a record for a week when there is no exceptional event, the total being £23,329, as against £22,568 for the preceding week and £22,805 for the corresponding week last year.

Argentine Tramways and Power Company.—The report to Sept. 30, 1915, states that the second section of the tramways was not ready for operation until March 31, 1915, and the third section until May 6, 1915. The supply of electricity for light and power was commenced on May 11. The revenue was nearly sufficient to provide the full year's interest on the £200,000 debenture stock. The development of the business has not been so rapid as was anticipated, owing principally to the depression in the Argentine accentuated by the war. The revenue is, however, gradually increasing.

Rangoon Electric Tramways and Supply Company.—The report for the year 1915 states that the total traffic receipts were Rs8,60,664, a decrease of Rs32,252, or 3.61 per cent. In the lighting and power department the gross receipts for current amounted to Rs7,32,172, an increase of 13.77 per cent. The gross profits were £63,347, and transfer fees and interest on deposits and investments in London yielded £1,307, making £64,654. Among the appropriations are the transfer to reserve for renewals account, £12,500, and to special reserve for cables, etc., £2,500, leaving £20,327, plus £2,766 brought forward. The directors recommend a dividend on the ordinary shares of three per cent. for the year, tax free, leaving £2,783 to be carried forward.

Lisbon Electric Tramways Company.—Mr. L. Breitmeyer presided at the annual meeting. The traffic receipts, he said, continued to establish a record. The increased expenditure was due mainly to the higher cost of coal, labour, and supplies. Coal had gone up to nearly £5 per ton, against 22*s.* 6*d.* in pre-war times an average of 42*s.* for the past year. The quality was also inferior. Their coal consumption was 20,000 tons annually, and they were studying the feasibility of substituting wood, partially or entirely. The increase in expenditure and the falling off in the rate of exchange had reduced the profits by £25,000, and the directors had been compelled to reduce the ordinary dividend from six to four and one half per cent. If conditions remained unfavourable the question of approaching the Camara in Lisbon for permission to increase the fares would have to be considered.

Calcutta Tramways Company.—Sir Henry Kimber, presiding at the annual meeting, said that the traffic receipts were £225,058, which showed a falling off of only £1,313. The working expenses were £118,189, or £2,683 less. There was thus a balance of working profit of £107,825. During the first half of the year there was a drop of over £5,000 in the traffic, compared with pre-war takings; but the second half showed an increase of upwards of £4,000. Compared with 1913 the receipts were practically the same. The expenditure showed reductions of about £1,300 in power and traffic expenses. There was an increase of £1,342 under the head of maintenance and repairs, due to the policy of improving the standard of track maintenance to meet the increasing demands. The capital expenditure during the year amounted to £11,720, for power station purposes. Capital now owed to revenue about £56,000. The result of the working was a final dividend of 6*s.* 6*d.* per share, making nine and one half per cent. for the year, which would be paid less income tax at the rate of 2*s.* 8*d.* in the £. That dividend was arrived at after making the usual contributions of £15,000 to the reserve fund and £1,309 to the provident fund. The receipts for the current year showed an increase of £4,721 over those for the same period in 1915. The Chairman added that the undertaking comprised thirty-five miles of track. There were 245 trains and ten trailers carrying 37,000,000 and upwards of passengers. They carried them 5,500,000 miles in the course of the year, in a maximum of 206 trains and cars run daily, and took in traffic receipts per train and car mile in Calcutta 10.16*d.*, while the expenses of running were 5.21*d.* Messrs. E. C. Morgan and W. R. Elston were re-elected directors.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of forty-five of the principal tramway undertakings in the United Kingdom, for the week ended May 20, give total receipts of £184,429, or £13,131 more than in the corresponding week of last year. The total length of track was 2,252 miles, or seventy more than for the corresponding week. The receipts this year were at the rate of £81 17*s.* 10*d.* per mile of single track, and last year at the rate of £78 10*s.* 1*d.*, thus showing an increase for the week of £3 7*s.* 9*d.* per mile open. The principal London, and a few of the provincial tramways have temporarily discontinued the publication of traffic receipts.

H. Lotery and Company, Ltd., have for private and family reasons converted their firm into a private liability company. No change has taken place in the management.

The British Westinghouse Company have issued an artistic calendar for the twelve months ending March 31, 1917. It is sent out by the publicity department at Trafford Park, Manchester.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. June 1.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	69½	69¾
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	73/1½	68/9
4%	4%	Do. 4% Deb. ...	100	91	75¼	75
4½%	4½%	Do. 4½% Deb. ...	100	98½	75¼	74
5%	5%	Do. 5% Deb. ...	100	96	77¼xd	79
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	18/3	18/3xd
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	95¼	95¼
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10¼	10¼
4½%	4½%	Do. 4½% Deb....	100	96	85	85
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$1	$1	Brazilian Trac. & Power Ord....	$100	66	63¾	63¼
$1½	$1½	Do. 6% Cum. Pref.	$100	97	96	93¼
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	6¾xd	6¾
2/6	2/6	Do. 5% Cum. Pref. ...	5	5	89/-xd	89/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	38½	38½
6%	5%	Do. Pref. Ord....	100	106	40½	40½
5%	5%	Do. 5% Cum. Pref.	100	103	57¾	57¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	62½	61¼
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75	74
70/-	70/-*	Do. 7% Pref.	100	55½	49	46¾
—	—	Do. 6% Pref. Ord.	100	17½	17 1/16	16¾
—	—	Do. Def. Ord.	100	11	10	10
5%	5%	Do. 5% Deb.	100	92	80	78½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	67¾	67¾
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¼	6¼	6xd
1/3	1/3	City of B.A. Trams.	5	5½	91/6	91/6xd
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	88¾	88¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	10⅝	11
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81xd	81
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¼	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅞	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9/15/9	10 1/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/6	2/4½
6d.	6d.	Do. 5% Pref.	1	9/16	8/6	9/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	78½	79
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48¼	48
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	102	103¾xd
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	72¼	72
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½	80½
$1½	$1½	Mexico Trams. Common ...	$100	70	27¼	26
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43	43
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94	94
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92	92
1/2*	1/2*½*	National Steam Car	1	15/32	16/-	15/-
9¾d.*	9¾d.*	New General Traction	1	½	7/9	7/9
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4¼	61/3	55/-
5%	5%	Do. 5% 1st Deb.	100	89½	72	72xd
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	15/32	10/7½	10/7½
8d.	10d.	Provincial Trams. Ord.	1	¾	17/3	17/3
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91¼	90¾
5%	5%	1st. Mt. 5% 50 yr.	100	89½	80½	79
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89½xd	89½
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	78½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	93¾	93¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds.	100	98	91¾	91¾
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	73¾	74
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅞	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅞	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1914-15	Latest Return. 1915-16	Aggregate. Wks.	Aggregate. 1915-16	Increase or Dec.
Anglo-Argentine	May 27	£53,580	£52,770	22	£1,081,416	— £681
Auckland.....(28 days)	Apr. 7	20,216	20,767	40	210,704	+ 3,553
Ballarat and Bendigo ...	Mar. 26	3,548	3,881	52	43,724	— 2,385
Brazilian Traction Mlrs.	Apr.	6,333,460	6,678,000	18	25,898,000	+1,475,940
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia.....$	Mar.	557,135	577,117	39	4,982,147	— 772,894
Buenos Aires Lacroze ...	May 11	44,480	41,503	48	454,605	— 11,116
Burmah Tramway ... Rs.	May 27	4,060	3,612	43	...	+ 7,192
Calcutta.....Rs.	„ 27	62,827	62,775	22	1,415,994	+ 83,582
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	Apr.	1,496	2,513	18	9,930	+ 3,272
Cordoba	Mar.	12,746	13,598	52	161,906	+ 6,251
East India	Apr.	1,864	2,116	39	18,706	+ 1,466
Hong Kong .....$	Apr. 22	10,198	15,946	19	215,089	+ 33,012
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	Mar.	4,582	4,613	13	13,492	+ 362
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon .....Escu.	Apr.	...	190,051	18	712,651	...
Madras (2 weeks).....Rs.	May 31	29,228	29,191	21	310,815	+ 24,500
Manila .....$	March	119,984	124,750	...	...	...
Manaos .....Rs.	March	...	157,156	...	...	...
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Mexico .....$	*	...	...	...	...	...
Montevideo	Apr.	26,786	28,997	26	187,419	+ 12,764
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway.....$	*	...	...	...	...	...
Rangoon	Apr.	4,964	4,849	18	19,787	— 74
Shanghai .....$	Apr. 26	23,284	25,305	...	...	...
Singapore .....$	Apr. 22	10,963	12,139	16	196,465	+ 23,956
Toronto.....$	Mar.	820,750	910,969	13	2,663,575	+ 232,148
Winnipeg	Mar.	303,209	296,500	13	887,310	— 81,239

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	May 23	£465	£367	— 98	8	£2,883	+ £79
Aberdeen Corporation...	„ 24	1,763	1,818	+ 55	51	90,836	+ 5,583
Accrington Corp.	„ 24	728	613	— 115	8	4,566	+ 45
Ayr Corporation	„ 29	322	359	+ 37	2	616	— 39
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 28	1,526	1,501	— 25	8½	12,145	+ 722
Birmingham Corp.	„ 27	14,955	16,601	+ 1,646	8	133,028	+ 22,033
Do. Motor Omnibuses	„ 27	1,141	1,015	— 125	8	7,413	+ 697
Blackburn Corp.	„ 24	2,007	1,404	— 603	8½	10,947	— 275
Blackpool & Fleetwood.	„ 27	1,479	524	— 955	21	8,770	— 6
Blackpool Corp.	„ 25	1,547	964	— 583	8	10,380	+ 1,297
Bolton Corporation	„ 28	2,605	2,878	+ 273	9	24,159	+ 1,991
Bournemouth Corp.	„ 31	2,005	2,169	+ 164	9	19,541	+ 3
Bradford Corporation	„ 27	8,639	6,664	— 1,975	8	55,681	— 1,432
Brighton Corporation	„ 28	1,290	1,201	— 89	8⅞	9,318	+ 456
Bristol	„ 26	13,767	10,584	— 3,183	21	197,468	+ 7,081
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	„ 27	1,957	1,680	— 277	9	15,521	— 1,559
Burton-on-Trent Corp...	„ 28	314	254	— 60	8	2,106	— 336
Bury Corporation	„ 28	1,664	1,445	— 219	8⅞	12,086	+ 112
Cardiff Corporation	„ 13	2,625	2,764	+ 139	6	16,668	+ 983
Chatham & District	„ 25	1,473	1,329	— 144	21	23,167	+ 1,066
Chesterfield Corp.	„ 18	249	268	+ 19	7	1,939	+ 134
Colne Corporation	„ 27	395	290	— 105	...	...	...
Cork Electric	„ 25	618	517	— 101	21	9,663	— 191
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	May 27	1,326	1,163	— 163	8½	9,216	+ 248
Dover Corporation	„ 27	360	323	— 37	8	2,483	— 30
Dublin & Lucan	„ 26	249	150	— 99	21	2,506	— 358
Dublin United	„ 26	7,472	6,208	— 1,264	21	112,350	— 9,846
Dundee City	„ 24	1,359	1,393	+ 34	1⅞	1,754	+ 86
East Ham Corporation	„ 27	1,434	1,394	— 40	8½	10,615	— 259
Exeter Corporation	„ 26	498	398	— 106	8	2,985	— 122
Glasgow Corporation	„ 27	22,819	24,079	+ 1,260	52	1,136,156	+ 78,838
Glasgow Subway	„ 27	1,035	1,182	+ 47	21	25,698	+ 2,831
Glossop (U. Elec. Supp.)	„ 27	157	143	— 14	22	2,908	+ 371
Halifax Corporation	„ 23	3,321	2,350	— 971	7⅞	17,122	— 938
Do. Motor Omnibuses	„ 23	77	50	— 27	7⅞	343	— 72
Hastings & District	„ 26	1,315	1,049	— 266	21	17,285	+ 187
Huddersfield Corp.	„ 27	3,883	2,920	— 963	8	23,615	+ 1,498
Hull Corporation	„ 27	3,311	3,139	— 172	8	25,038	— 987
Ilford U.D.C.	„ 27	801	723	— 79	7	5,667	+ 363
Ilkeston Corporation ...	„ 31	119	140	+ 21	9	1,197	+ 59
Ipswich Corporation	„ 27	680	568	— 112	8	4,009	+ 146
Isle of Thanet	„ 27	588	348	— 240	34	9,103	— 1,655
Kilmarnock Corp.	„ 27	159	161	+ 2	1⅞	283	— 46
Lanarkshire	„ 15	2,093	2,371	+ 278	21	45,392	+ 7,482
Lancashire United	„ 24	2,102	1,942	— 160	21	34,961	+ 1,741
Leeds City	„ 27	11,651	9,914	— 1,737	9	79,279	+ 5,847
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	„ 27	798	876	+ 78	1⅞	1,504	+ 128
Leyton U.D.C.	„ 25	1,846	1,764	— 82	8	12,945	— 411
Liverpool Corporation...	„ 27	15,371	14,471	— 900	21½	284,587	+ 12,923
Llandudno & Colwyn B.	„ 19	317	294	— 23	24½	5,450	— 226
London County Council	„ 17	22,460	46,978	+24,518	6½	315,496	+ 9,369
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	„ 27	213	139	— 74	33½	4,370	— 1,295
Maidstone Corporation..	„ 25	275	210	— 65	8	1,772	— 55
Manchester Corp.	„ 29	21,197	19,094	— 2,103	8	151,809	+ 6,291
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	„ 20	180	208	+ 28	7½	1,601	+ 207
N'castle-on-Tyne Corp.	„ 27	6,531	6,548	+ 17	8	50,579	+ 814
Newport (Mon.) Corp.	„ 27	1,043	924	— 119	8	7,425	+ 1,405
New St. Helens & Dist.	„ 24	1,578	1,094	— 484	47	46,733	+ 2,983
Northampton Corp.	„ 26	1,074	712	— 362	8	5,571	— 693
Nottingham Corp.	„ 25	4,473	3,946	— 527	8	30,133	+ 543
Oldham Corporation ...	„ 28	2,712	2,513	— 199	9	23,632	+ 1,036
Portsmouth Corp.	„ 27	3,177	2,850	— 327	8	21,873	+ 154
Preston Corporation	„ 24	1,249	1,144	— 105	7⅞	8,257	+ 574
Provincial	„ 27	2,957	2,509	— 448	34	72,215	+ 4,021
Reading Corporation	„ 25	978	841	— 137	7⅞	6,371	+ 289
Rhondda Tramways	„ 18	1,123	1,228	+ 105	20	23,767	+ 1,354
Rochdale Corporation...	„ 27	2,255	1,806	— 449	8½	14,967	+ 124
Rotherham Corp.	„ 31	1,126	1,416	+ 290	8½	12,199	+ 2,493
Salford Corporation	„ 29	6,306	5,569	— 737	8⅞	45,830	+ 1,738
Sheffield Corporation.	„ 28	9,678	10,573	+ 895	9	92,782	+ 14,717
Southampton Corp.	„ 24	1,800	1,672	— 128	7⅞	11,961	+ 461
Southend-on-Sea Corp...	„ 24	1,134	839	— 295	8	5,966	— 854
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	„ 27	931	807	— 124	8½	6,431	+ 173
Sunderland Corp.	„ 28	1,678	1,575	— 103	8	12,777	+ 340
Sunderland District...	„ 24	870	664	— 206	30	17,196	+ 801
Swindon Corporation ...	„ 24	241	221	— 20	7⅞	1,536	+ 82
Torquay Tramways	„ 25	759	609	— 150	21	9,907	— 78
Tyneside Trys. & Tmrds.	„ 17	613	546	— 67	20	10,130	— 428
Wallasey Corporation ...	„ 27	1,668	1,322	— 346	8½	10,681	+ 99
Walsall Corporation	„ 27	1,028	819	— 209	22	16,771	+ 1,987
Walthamstow U.D.C.	„ 27	1,259	1,193	— 66	8	8,682	+ 1,285
Warrington Corp.	„ 18	443	473	+ 30	7	3,335	+ 353
West Ham Corporation	„ 25	3,483	3,436	— 47	7⅞	25,551	+ 887
Wigan Corporation	„ 25	1,822	1,686	— 136	8	13,045	+ 476
Wolverhampton Corp.	„ 31	1,022	1,178	+ 156	9	10,572	+ 809
Yorkshire (W. Riding)...	„ 28	2,372	1,729	— 643	22	36,580	+ 2,996

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM

COAN CASTS CLEAN CRANK CASES

CASTINGS
MADE AND REPAIRED.

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, JUNE 8, 1916. VOL. XXXIX.

NORTH EASTERN RAILWAY ELECTRIFICATION.

EQUIPMENT OF THE SHILDON-NEWPORT MINERAL BRANCH.

The North Eastern Railway Company was one of the first main line British railways to adopt electric traction, for as far back as 1904, when Sir George Gibb was general manager, the company successfully applied electrical operation to their Newcastle and Tyneside suburban traffic. Once more this company has acted as a pioneer of electric traction in applying it to heavy freight haulage. In 1911 the general manager, Sir A. Kaye Butterworth, instructed their consulting electrical engineers, Messrs. Merz and McLellan, to report generally on the question of electrification with reference to the special conditions of the North Eastern system. The company's chief mechanical engineer, Mr. Vincent Raven, visited the United States with Mr. Merz in 1911, and on their return the directors decided to proceed at once with a preliminary scheme.

The Shildon-Newport route, an important freight line dealing almost exclusively with heavy mineral traffic, was selected for trial, and its electrification was so far completed by July 1, 1915, that a limited service was begun. At the present time a night service is in operation, work on the completion of the overhead equipment being carried on by day.

Some historical interest attaches to the route, since the track runs over a portion of the original Stockton to Darlington Railway, the first public railway on which steam locomotives were used for conveying passengers and goods. This line was opened in 1825, and two of the original locomotives designed by George Stephenson are to this day preserved in the Darlington Station of the N.E.R. The fact that the first trial in England of electrification for heavy freight haulage on a large scale should be carried out on this particular route is noteworthy.

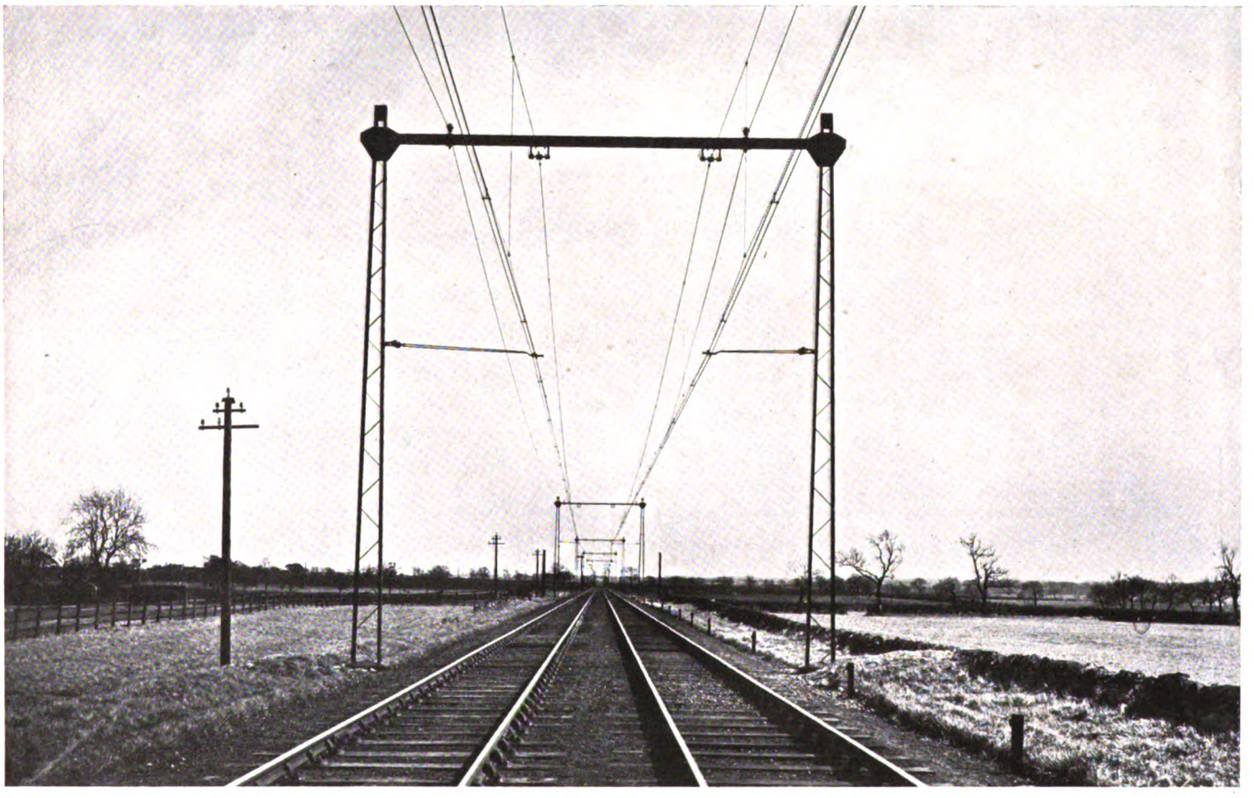


Fig. 1.—General View of Overhead Equipment—Shildon-Newport Line, North Eastern Railway.

Beyond the usual considerations affecting the decision to apply electric traction to such a line, there was a special factor which differentiated the North

Digitized by Google

Eastern Railway lines from others in the United Kingdom. As is well known, the production and distribution of electric power has been developed upon a larger scale on the North East coast than in any other part of this country, and a large proportion of the power is derived from electric generating stations using as fuel the waste heat and gases derived from coke ovens and blast furnaces in the Durham and the Cleveland districts. An ample supply of cheap electrical energy was therefore available from the systems of the existing power companies, and this fact, obviating as it does the necessity for a large capital expenditure by the railway company on power station plant, had an important bearing on the whole scheme.

The electrified line, of which a typical view is given in Fig. 1, has a route length of between 18 and 19 miles, and connects the mineral sidings at Shildon, which form one of the largest marshalling yards in Great Britain, with the Erimus sidings at Newport, near Middlesbrough. A considerable portion of the sidings at both ends is also electrified, so that, including the sidings, about fifty miles of single track are equipped for electric working.

The route now electrified is shown in Fig. 2. As will be seen in Fig. 34, the ruling gradient is in favour of the laden traffic, the steepest gradient being 1 in 103. The line carries the heavy mineral traffic from the South West Durham coalfields to the Middlesbrough district, supplying the large number of blast furnaces and ironworks concentrated there. On the return journey the load consists mainly of empty wagons returned to Shildon sidings.

Overhead Track Equipment.

It was decided to adopt the high tension direct-current system, energy being supplied to the locomotives through overhead contact wires at a pressure of 1,500 volts from the two rotary-converter substations described later. The overhead track equipment was carried out under the supervision of the railway company's then chief engineer, Mr. C. A. Harrison.

Figs. 1, 3 and 4 show the type of catenary construction adopted. The overhead contact wires on the main portions of the track consist of two hard-drawn copper conductors, each ·155 sq. in. section, but on certain portions of the sidings, where the loads are not so heavy, a single contact wire only is used. The wires are supported by a solid steel auxiliary catenary wire, to which they are attached by sliding clips. This auxiliary catenary is in turn suspended from the main stranded steel catenary by means of steel wire droppers. The main steel catenary wire is supported from the steel structures, shown in several of the accompanying views, by means of special insulators, double insulation being used throughout. The normal span between the steel structures is 110 yards, but on curves and sidings they are placed at lesser intervals depending on the conditions existing.

The normal height of the contact wire from rail level is 16 ft. 6 in., but at level crossings this is increased to 18 ft. 6 in., and under some of the low bridges, of which there are a large number on this route, the height from the rail level is reduced, the minimum height being about 13 ft. 8 in.

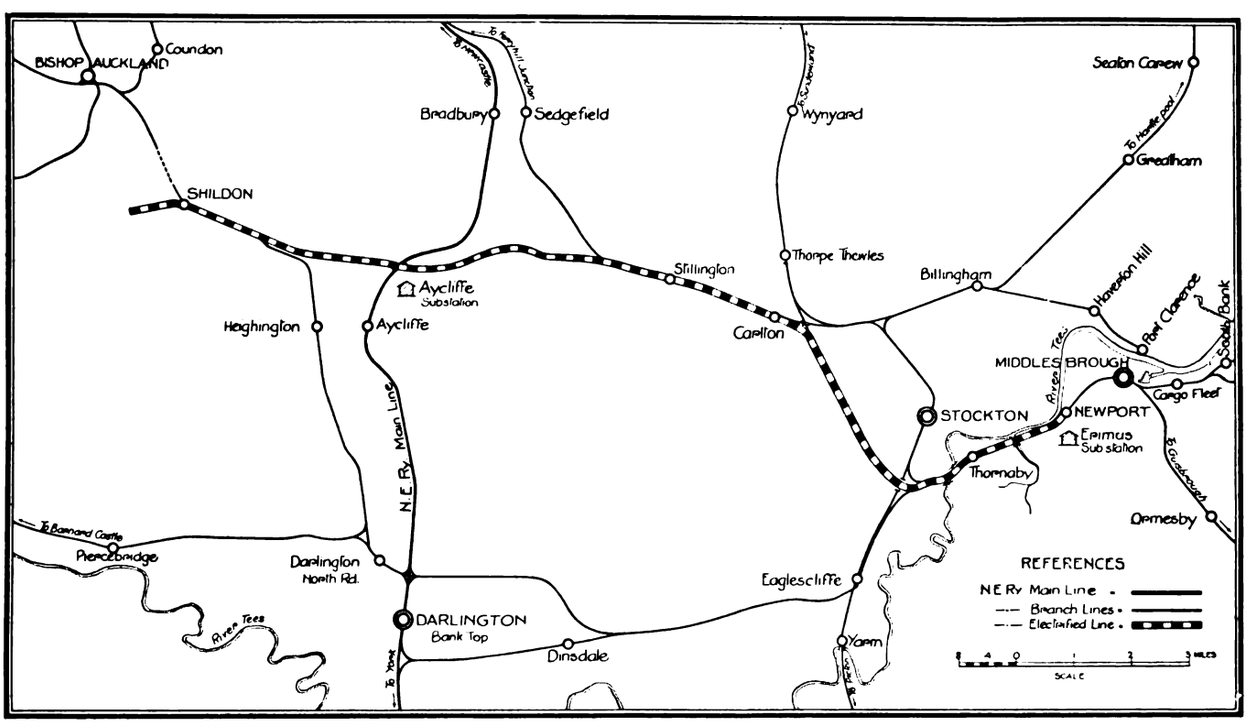


Fig. 2.—Map Showing Electrified Line from Shildon to Newport, North Eastern Railway.

Two auxiliary stranded copper feeder wires, one for each track, of ·194 sq. in. section, are carried on the top of the steel structures referred to, and are connected in parallel with the main contact wires at frequent intervals. The purpose of these feeder wires is to increase the conductivity of the overhead equipment.

Each steel structure carries a pair of insulated steadying arms (Figs. 3 and 4). These steadying arms are pivoted in all directions, and are attached to the contact wires by means of clips, their purpose being to fix the position of the contact wire relatively to the track. The contact wires are staggered in the usual way to prevent undue wearing of the bow collectors.

The general type of steel structure carrying the wires over straight parts of the track can be seen in Fig. 1. It consists of two steel masts and a cross girder, each of these being made up of two channels with flat steel bracing. On curves a centre strut, steadied by steel tie rods, is added, as shown in Fig. 4,

Digitized by Google

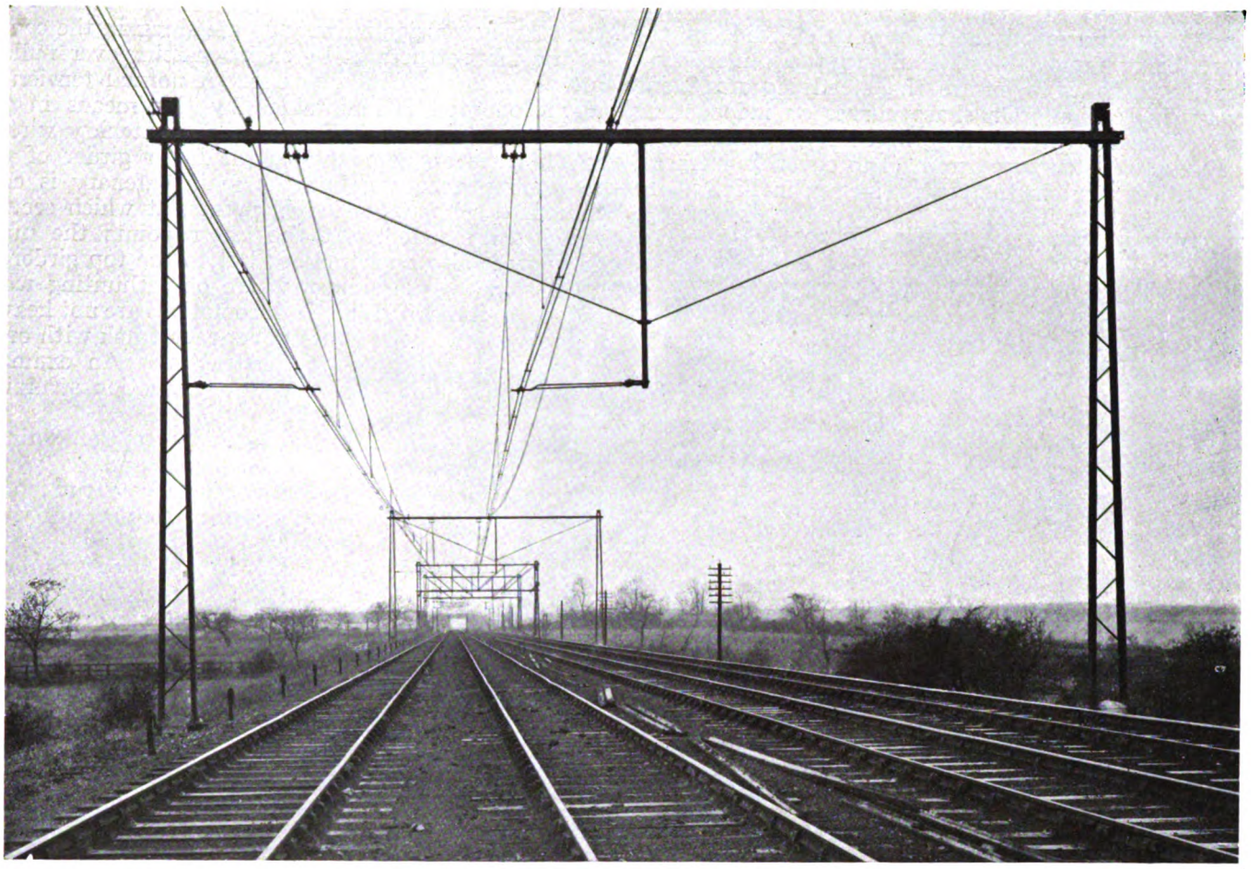


Fig. 3.—Gantries Spanning Four Tracks near Carlton Station.

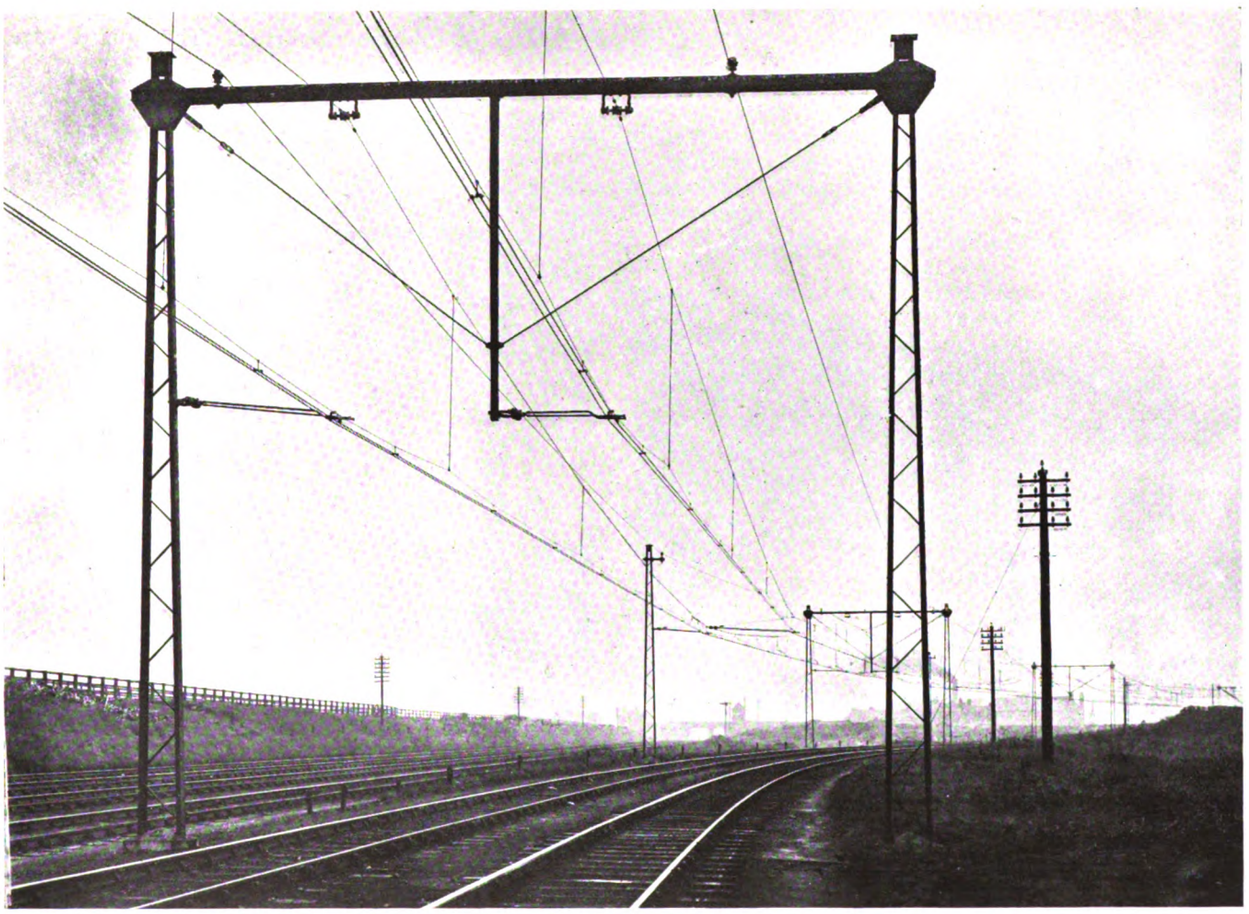


Fig. 4.—Overhead Construction at the Curve at Bowesfield Junction, Showing Use of Independent Pull-Off Mast.

Digitized by Google

the steadying arm on the mast on the inside of the curve being removed and fixed to the centre strut mentioned, so as to ensure the steadying arm being always in tension. On sharp curves an independent pull-off mast is fitted where necessary, as illustrated in Fig. 4. A structure arranged to cover four tracks, also with a strut in the centre, is seen in Fig. 3. In

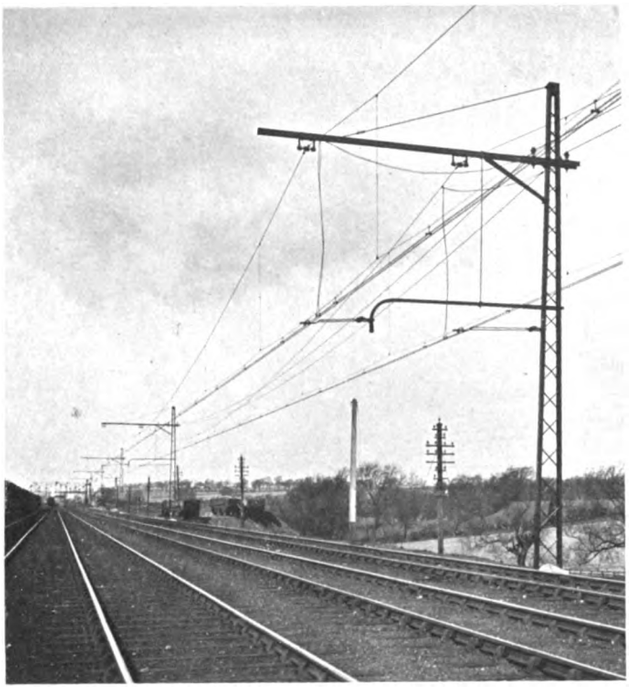


Fig. 5.—Cantilever Construction over Two Tracks.

this case the purpose of the strut is to carry the steadying arm without a centre mast, while for the time being two tracks only are equipped.

In Fig. 5 an arrangement is shown of a two-track structure where it was impossible to erect two masts. Cantilever construction is here adopted, the general features of which can be seen in the illustration. A similar cantilever construction over a single track is illustrated in Fig. 6. In this case, it will be noted that wood poles were used, a short length of single track being equipped in this way for experimental purposes.

All steel structures carrying the overhead track equipment are bonded to the running rails by means of a hard copper bond of ·08 sq. in. section. Any steel structures carrying signals, which are in proximity to the electrical equipment, are also similarly bonded to the running rails.

In order to limit as far as possible the sag of the contact wires, due to temperature variation, automatic tensioning was adopted. The tensioning points are approximately 1,100 yards apart. Fig. 7 shows a typical tensioning structure. Two of these structures are placed 65 yards apart at the end of each tension length, the wires from the opposite lengths overlapping by this amount. The end of each contact wire is raised at the tensioning structure to which it is fixed to a height of about 18 in. clear of the normal level at that point, so that the locomotive bows ride gently and without shock from one tensioning length on to the next. The contact wires are anchored to the auxiliary catenary wire at a point two-thirds of the distance along each tensioning length in the running direction.

The tensioning structures consist of strong steel masts made up of four angle irons with angle iron bracing, and it will be seen from Fig. 7 that the structures are fitted with two cross girders with a centre strut. The tensioning weights are slung in the centre of the mast structures by chains passing over pulleys attached to the contact wires. A normal tension of about one ton is maintained by this means in the double contact wire. The auxiliary catenary wire is in all cases anchored off to the lower girder of the tensioning structure, but the main catenary is continuous except at tensioning points, at which section switches are fitted. At the latter points the main catenary is also anchored off, but to the top girder.

On some of the sidings where only shunting work is done, and the loads on the locomotives are not heavy, a single contact wire is used over each track with ordinary tramway span wire construction. An example is shown in Fig. 8 where such a construction spanning seven tracks can be seen.

On some of the marshalling and reception sidings, which are not equipped throughout, and on which it is only necessary for the overhead construction to permit of the locomotives entering to pick up their load, the wires are terminated as shown in Fig. 11. Danger boards are fitted, beyond which electric locomotives should not pass, but if by any chance they should over-run these, the terminal construction is such that no damage would be done to the bow collectors or to the overhead track.

Fig. 9 shows a typical low stone bridge of which, as previously mentioned, there are a large number on this route. At some of these bridges it is possible to carry the main catenary wire through the bridge, but at most of them it is necessary to anchor it off to the bridge. In these cases, in order to obtain the necessary clearance, the contact wires, together with the auxiliary catenary, are brought towards the centre of the bridge, so that contact is made towards the extreme end of the bow collector. In order to prevent the other end of the bow collector from striking the bridge, a guard wire is fitted. This guard wire is

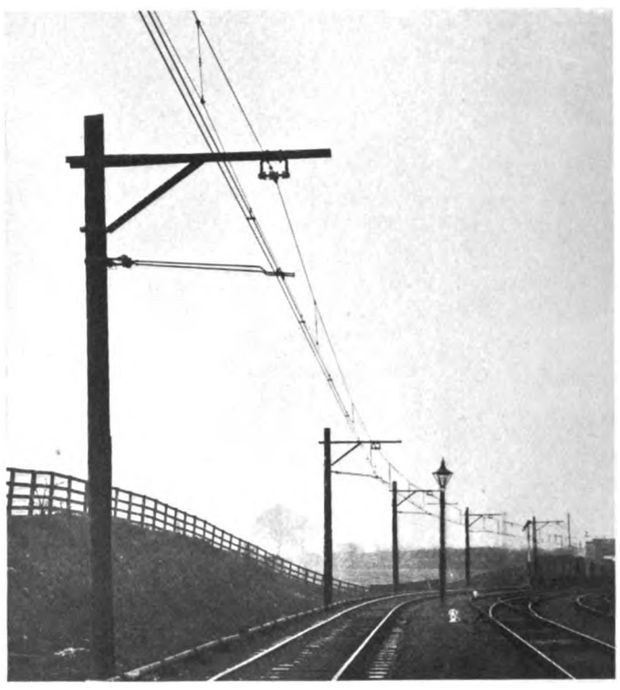


Fig. 6.—Cantilever Construction with Wooden Poles over One Track.

anchored off to the structures on either side of the bridge, and is only alive while a locomotive is passing underneath.

The track is sectioned on the normal length at intervals of about 2½ miles, and considerably more

Digitized by Google

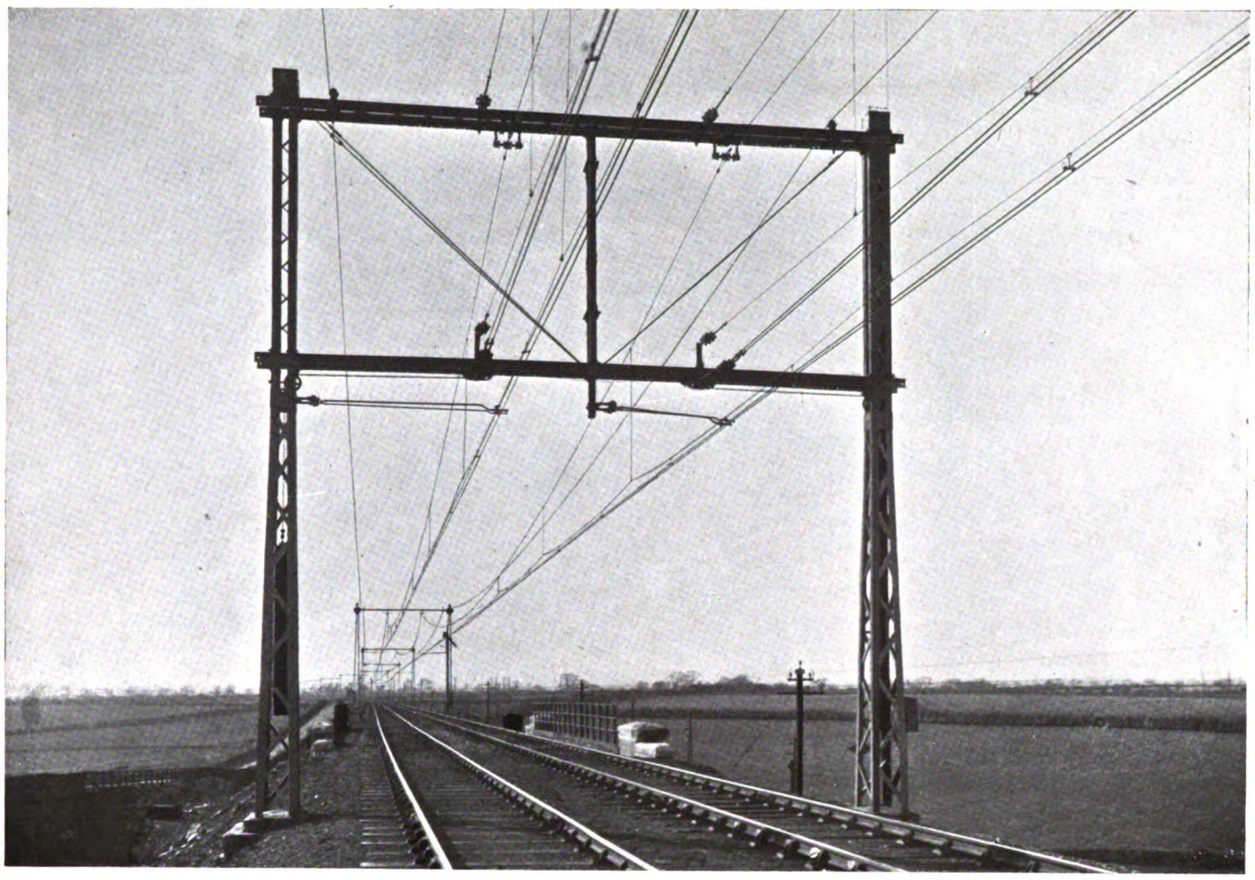


Fig. 7.—Typical Tensioning Structure.

frequently on sidings. Section points are arranged to occur in most cases at tensioning points so as to avoid the use of section insulators. The type of section switch adopted is illustrated in Fig. 12. These switches are fitted in the open, so that it is permissible to use the horn break arrangement which can be seen in the figure. They are erected on the uppermost cross girder of the section structures, and operated by levers in the signal cabin to which they are connected by the usual arrangement of railway point rods. Fig. 10 shows a view of five section switches fitted on a girder. Normally the tracks are coupled in parallel, but by means of the section switches the up and down tracks can be operated separately if desired.

As the train control system of working is in use on this route, the signal cabins are connected by telephone with a central control office situated at Newport, and the handling of these switches is directed from the

Fig. 8.—Span Wire Construction over Seven Sidings.

Fig. 9.—Method of Suspending Wires at Low Bridge.

Digitized by Google

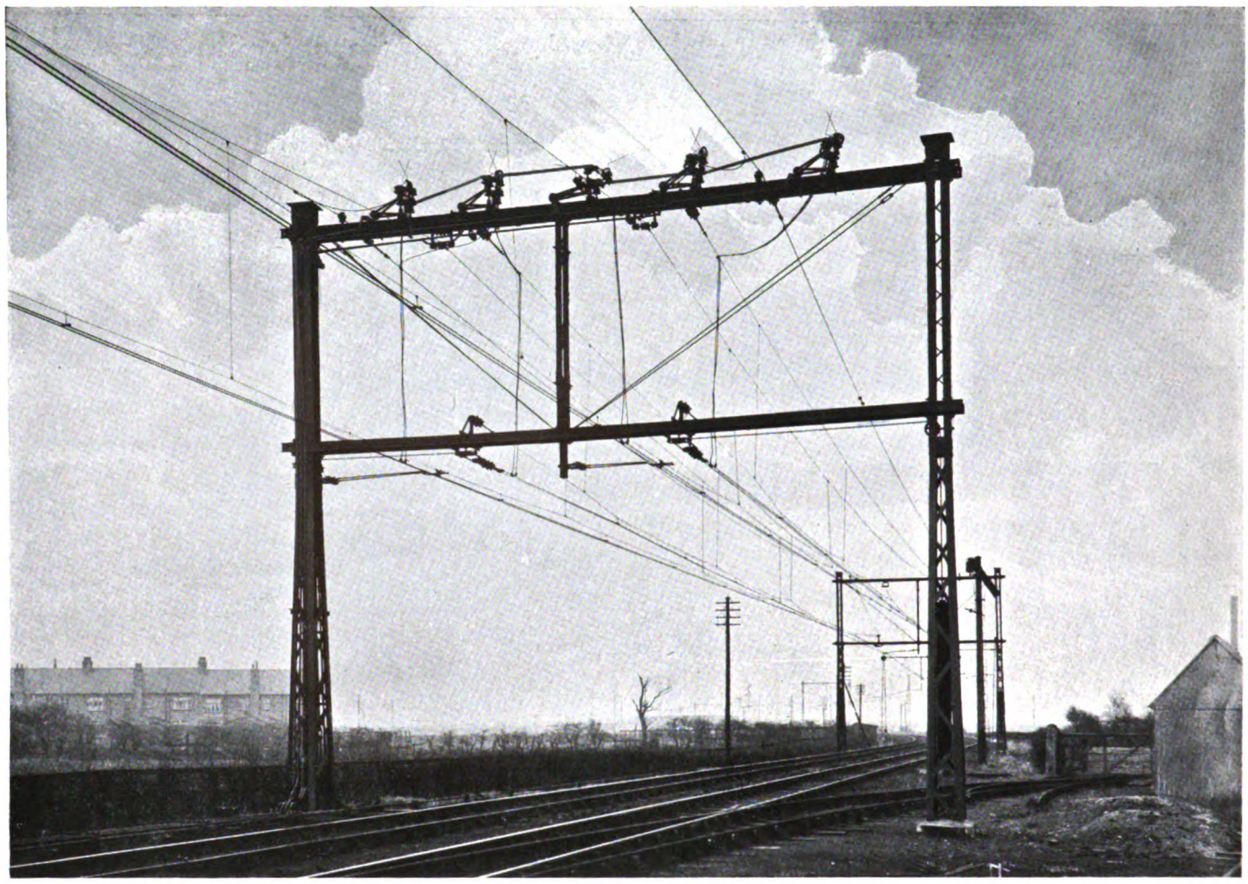


Fig. 10.—Five Section Switches, as illustrated in Fig. 12, Fitted on a Girder.

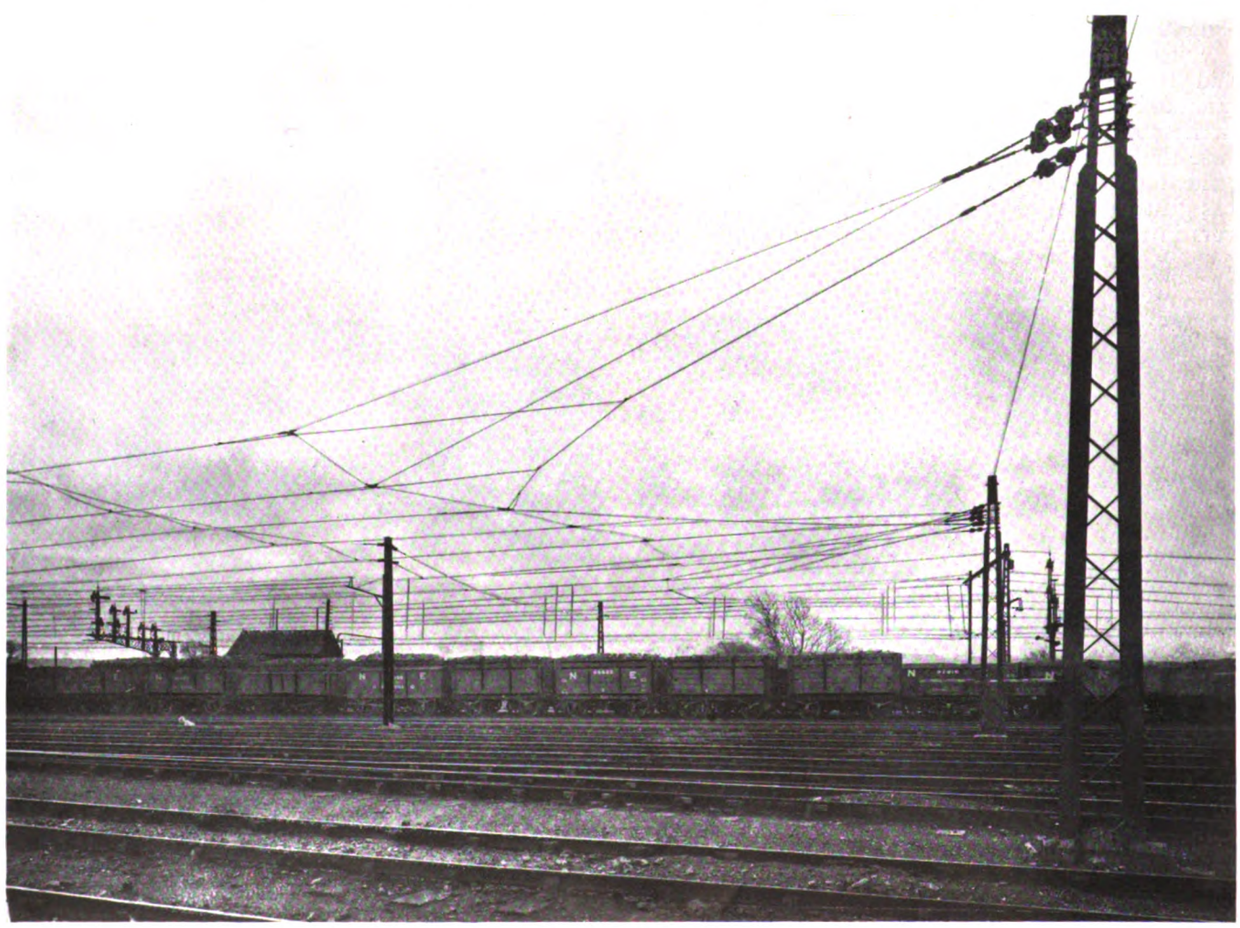


Fig. 11.—Overhead Wire Arrangement at Terminal.

Digitized by Google

same point. In certain positions, such as at cross-overs and some of the sidings, where it was impossible to avoid their use, section insulators are fitted. The type of insulator is shown in Fig. 13. In all cases,

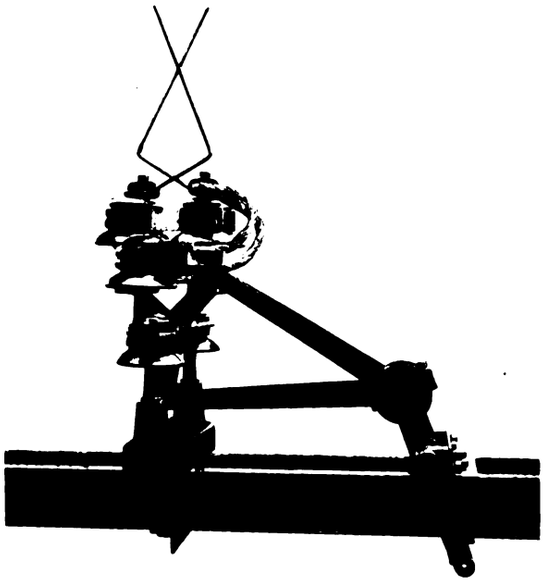


Fig. 12.—Section Switch.

however, these are fitted at points where the locomotives are travelling at low speed.

The track rails are bonded at the joints with stranded copper bonds fitted under the fishplates, two bonds each of ·109 sq. in. section being fixed at each joint. They are also cross bonded between the two rails at intervals of 300 ft., and between the two inner rails of adjacent tracks at the same interval, the bonds in the 6-ft. way being midway between those in the 4-ft. way.

SUB-STATIONS.

As will be seen from Fig. 2, there are two rotary converter sub-stations converting the 3-phase 40-cycle high tension current as received from the power companies' system to direct current at 1,500 volts for the overhead wires.

The sub-station at Aycliffe, which externally is similar to that at Erimus, is shown in Fig. 14. The sub-station at Aycliffe contains two 800-KW. rotary sets, each set consisting of two 400-KW. rotary converters in series. The general arrangement of the sub-station is shown in Figs. 15, 16, and 17, and Fig. 21 gives a general view of the interior, in which a portion of the high tension A.C. switchboard can be seen. Fig. 22 gives a view of the D.C. switchboard.

It will be noticed in Figs. 21 and 22 that, this being a high tension sub-station, the machines are enclosed by expanded metal screens. The rotary converters were built by the British Thomson-Houston Company, Limited, and the transformers by the British Westinghouse Company. The rotaries are of the self-synchronising type, and are started by oil immersed drum type starting switches. The Erimus sub-station is generally similar, and two rotary sets are also fitted, but in this case one is of 1,200-K.W. capacity.

In designing the sub-stations it was necessary to decide whether the 1,500 volts should be generated in the armature of a single rotary or by connecting two rotary converters together in series to form one unit.

Fig. 14.—Aycliffe Sub-Station.

The scheme of connecting two rotary converters in series to generate 1,500 volts was eventually adopted, as it enabled the machines to be designed with a reasonable commutator speed and a very conservative value of voltage between commutator bars. The machines run at 800 revolutions per minute.

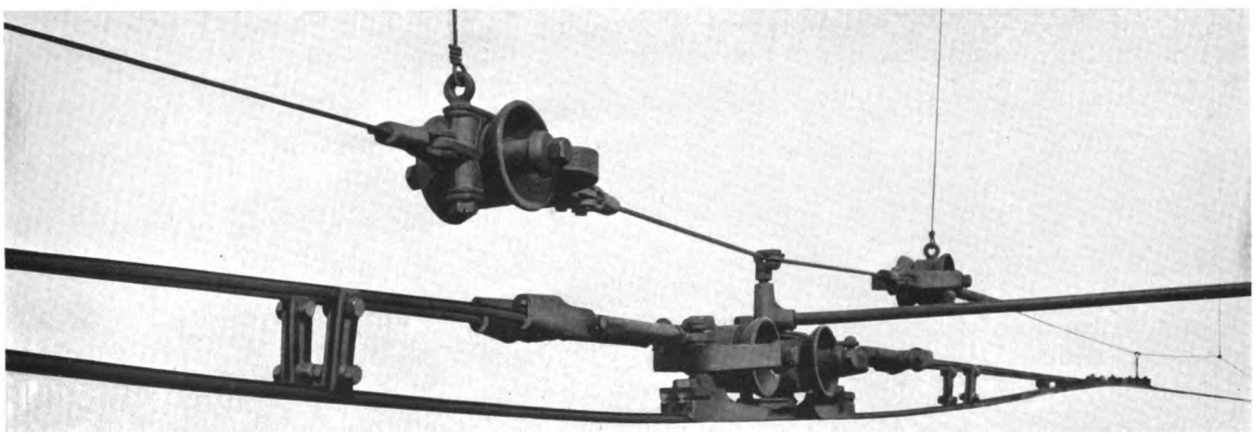
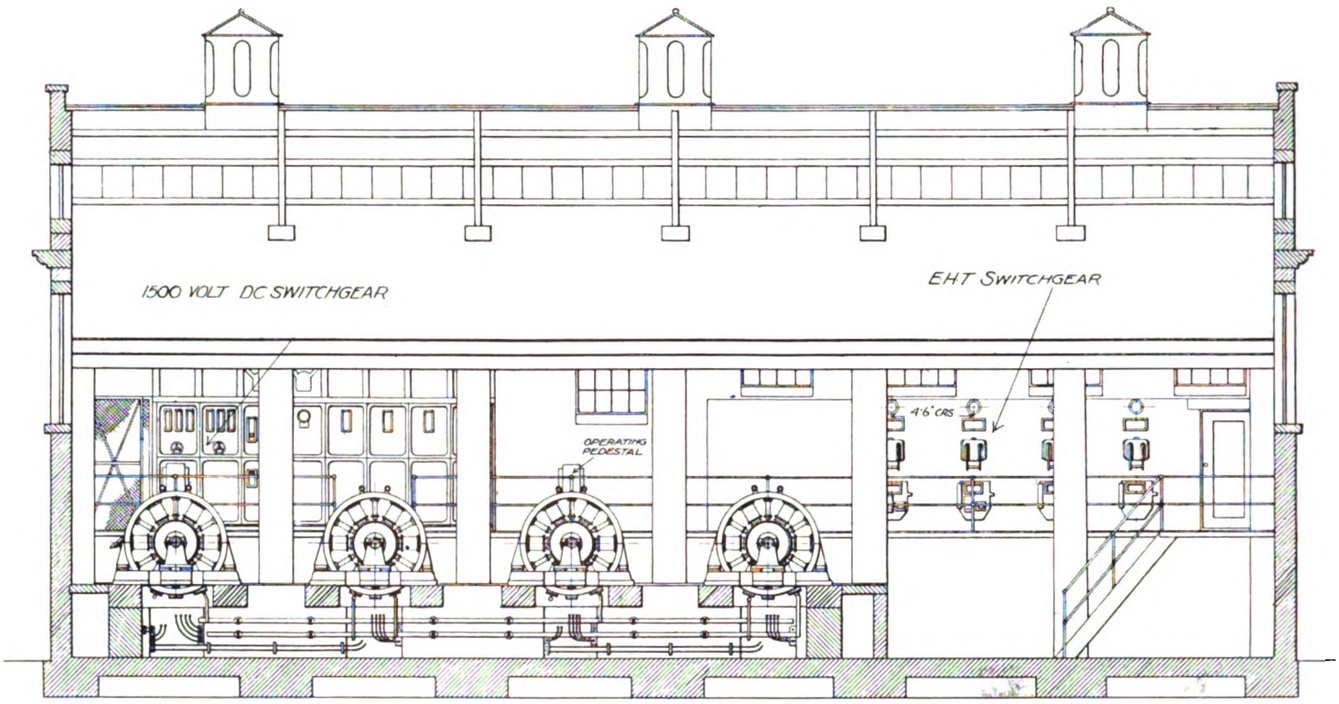


Fig. 13.—Type of Section Insulator.

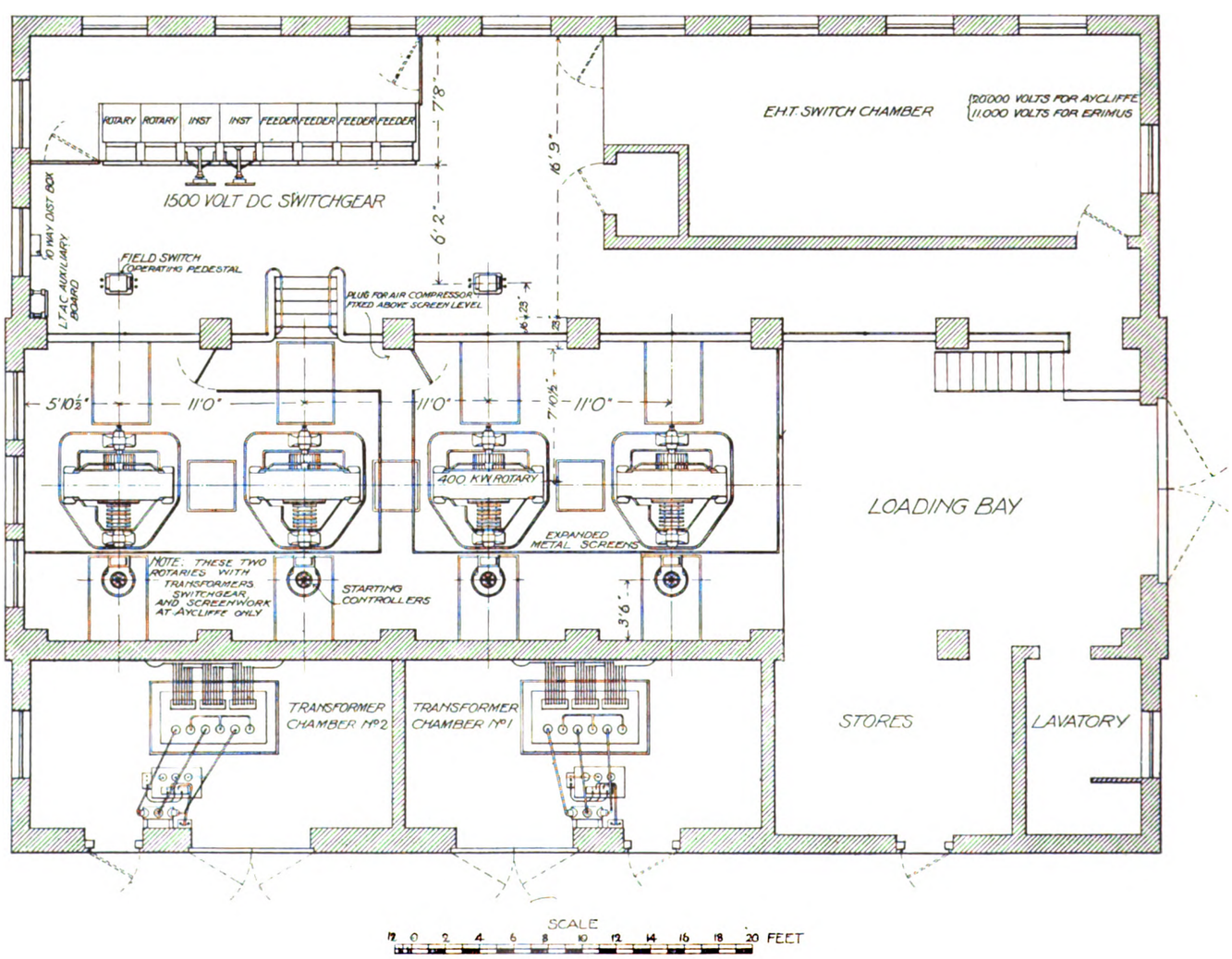
They were designed and tested to operate normally at 95 per cent. leading power factor, and to withstand an overload of 50 per cent. for two hours, 100 per cent. for ten minutes, and 200 per cent. momentarily. They were subjected to a high potential test of 5,000 volts for five minutes.

On account of the high voltage on the commutator, these machines were specially designed to avoid

Digitized by Google



Longitudinal Elevation.



Plan.

Figs. 15 and 16. Section and Plan of Aycliffe Sub-Station.

Digitized by Google

damage due to flash over occasioned by short circuits on the system. The operating parts of the brush gear were entirely enclosed, the distance between brush arms was made as great as possible, and the commutator was completely screened by arc-proof insulating material from the armature and frame of the machine (Fig. 19).

other for supplying lighting and auxiliary power in the station for portable air compressors, etc.

The sub-stations are supplied with three-phase current from the interconnected mains system of the North East coast power companies through the Cleveland and Durham Electric Power Company. Aycliffe is supplied at a pressure of 20,000 volts between

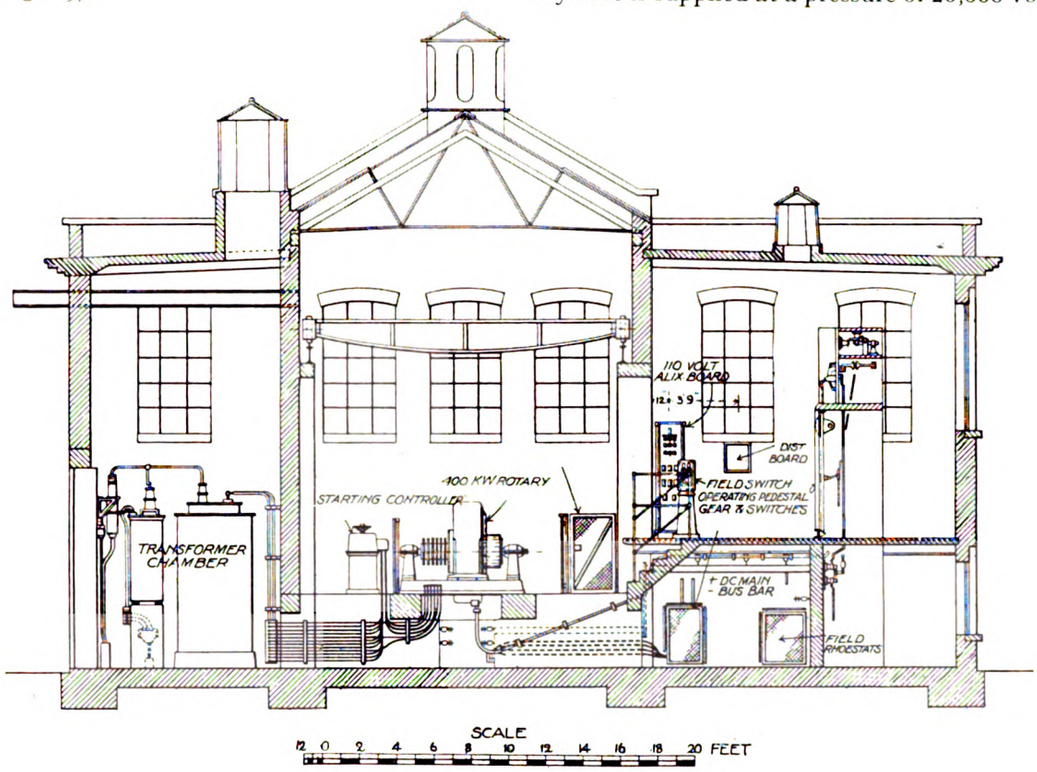


Fig. 17.—Cross Section of Sub-Station.

Tests were carried out to determine what load could be suddenly thrown on and off these sets without flashing. A load amounting to five times that of the full load was thrown on and automatically tripped off with a breaker seven times, and three times out of the seven the machines stood this severe test without flashing. Fig. 18 shows an oscillograph which was

phases through two overhead lines. The 20,000-volt switch gear is of the Reyrolle ironclad wall-operated type. The Erimus sub-station is supplied at a pressure of 11,000 volts between phases through underground cables connected to the power company's system in the Middlesbrough district, the alternating current switch gear being of the same type as that of Aycliffe

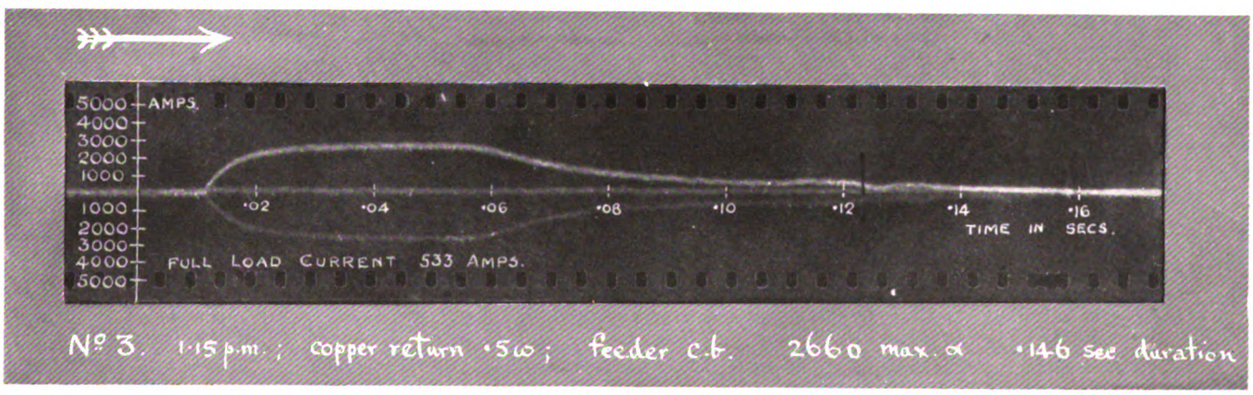


Fig. 18 —Oscillograph Record during Test of Rotary.

taken during one of the tests when the rotaries did not flash over.

Two auxiliary transformers are installed in each sub-station connected directly across the high tension terminals of the main transformers. A feature of interest in connection with these is the fact that they were fitted with a double secondary winding, one section being used exclusively for metering, and the

The direct current switch gear at both sub-stations is of the brick cell type. Fig. 20 shows a diagram of connections of Aycliffe sub-station, and along with this the following switch gear details will be useful :—

In each of the sub-stations the E.H.T. switch gear is of the ironclad compound-filled type, the ironclad gear being fitted in a special chamber on the switch-board

Digitized by Google

gallery, with the control panels and instruments mounted immediately in front of same.

A special feature of the transmission scheme is the high-voltage D.C. gear. This switch gear has been designed somewhat on the lines of that usually adopted for high tension A.C. boards, that is to say, the apparatus is of the remote controlled type, and is mounted in cell structure built up of brick walls with moulded stone division slabs, each equipment being thus entirely separated from its neighbour.

The individual cells are built up on the cubicle system, that is to say, special compartments are provided for: (1) busbars and isolating switches (top cubicle), (2) circuit breakers (intermediate cubicle), (3) the bottom cubicle contains the operating mechanism for the isolating switches and circuit breakers, also the connecting cables passing up to the circuit breaker units. From this it will be seen that no H.T. gear is accessible below the circuit breaker cubicle. Further, when it is desired to work on the circuit breakers these can be entirely disconnected from the busbars by means of busbar isolating switches. The circuit breakers and busbar isolating switches are mounted on polished white marble panels built into the cell structure, suitable angle iron supports being provided for bolting into the brick division walls.

The busbar isolating switches are of the H.T. rotary type, that is to say, the contact units are mounted on porcelain insulators carried on moulded stone slabs forming part of the cell structure. The contact blades are fixed on porcelain insulators of the sleeve type, carried on a rotating shaft fixed to the cell structure by means of stout wrought-iron brackets.

The circuit breakers included in this scheme are specially designed for high voltage work, the break being exceedingly large and quick. The breakers are of the brush-contact type with auxiliary copper sparking tips, and special carbon blocks to take the final break. These blocks are designed with an ample margin of contact area, and in addition are fitted with magnetic

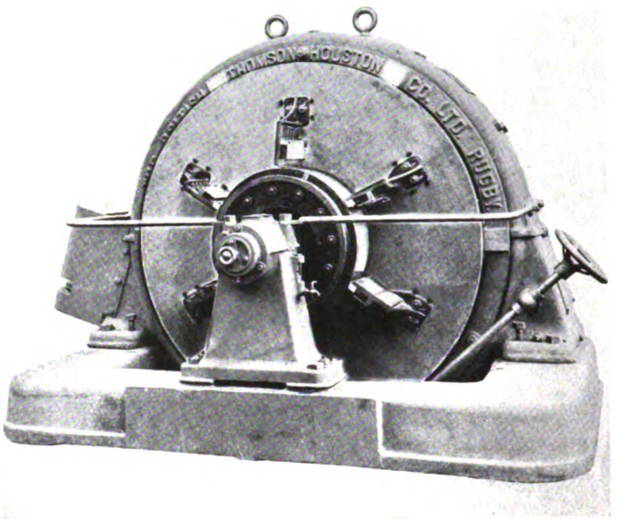


Fig. 19.—Rotary Converter.

ears in order to take care of the breaking of the arc. On service this device has been found to give exceedingly good results. The feeder circuit breakers are of the plain over-load type, and are designed to give a very heavy setting in order to take care of the momentary

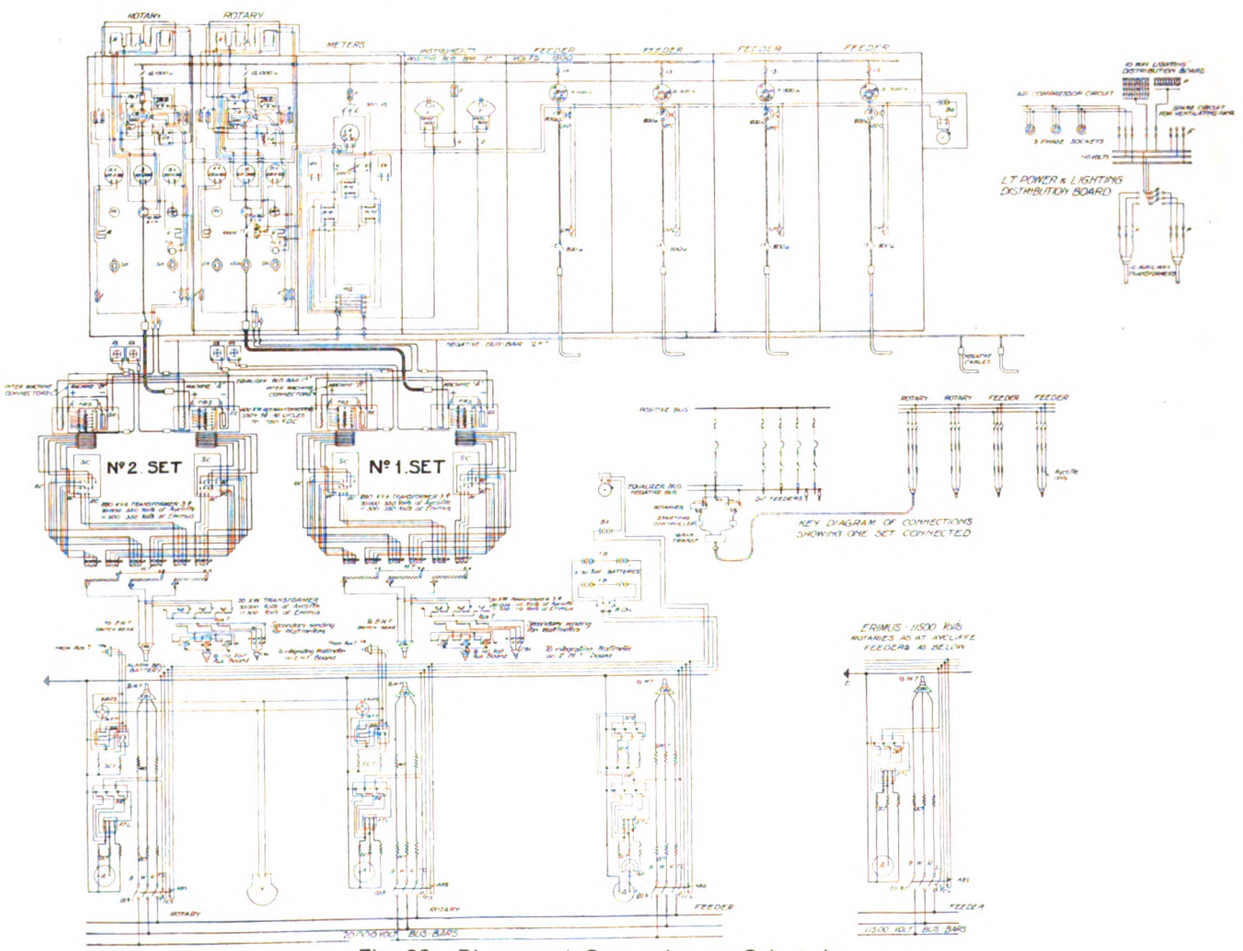


Fig. 20.—Diagram of Connections at Sub-stations.

Digitized by Google

Fig. 21.—Interior of Aycliffe Sub-station.

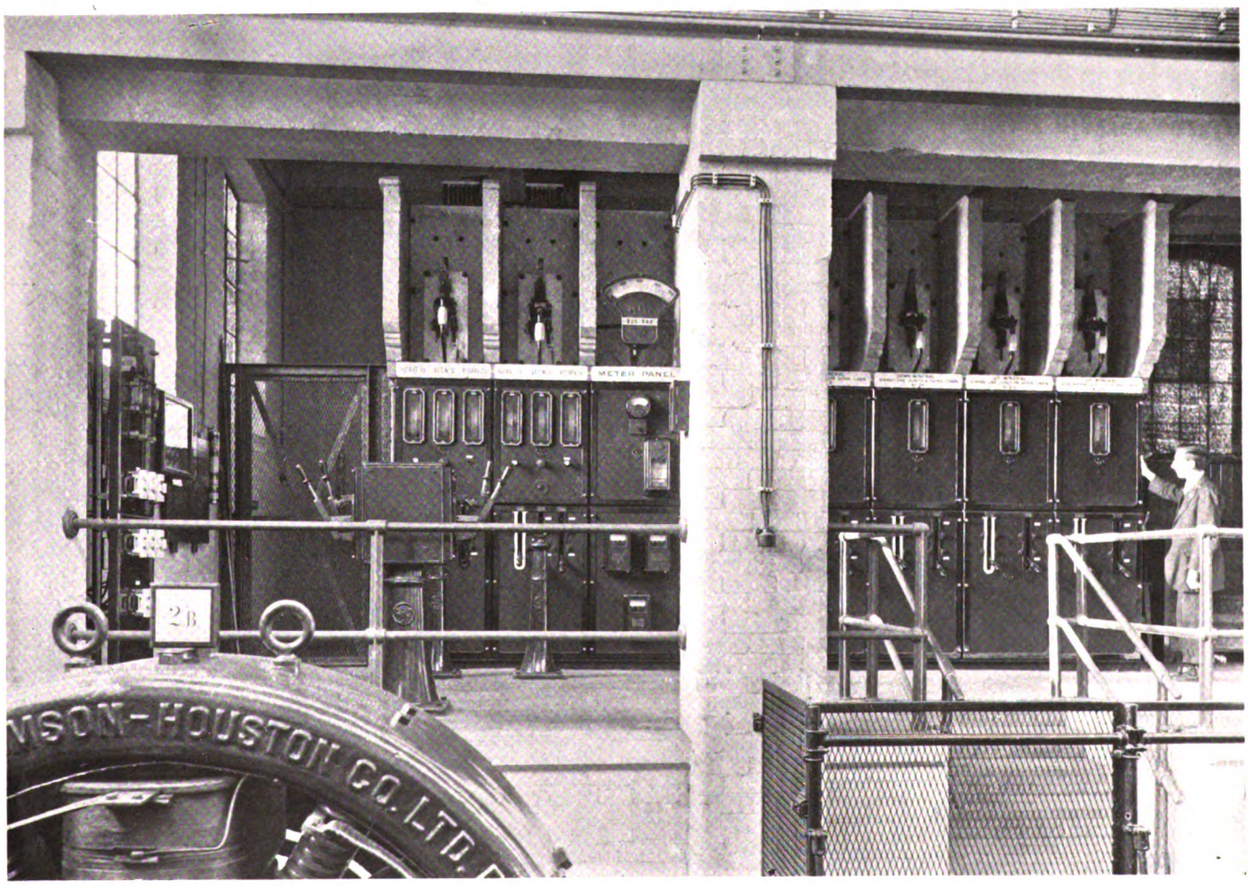


Fig. 22.—D.C. Switchboard at Aycliffe Sub-station.

Digitized by Google

overloads experienced in a traction system of this description. The machine circuit breakers are of the overload and reverse current type. In conjunction with the reverse current a special single-pole relay of the differential type is provided, so that in the event of the rotary converter coming up of the wrong polarity it is impossible to close the circuit breaker on to the busbars. This relay is coupled up across the main contacts of the circuit breaker, and operates on to a shunt trip coil fixed to the circuit breaker release mechanism. This shunt trip coil is also arranged for operating from the over-speed device on the rotary converter sets.

For the metering of the power in the sub-stations, integrating wattmeters are fitted on the E.H.T. rotary equipments, and on the D.C. side 2-wire integrating watt-hour meters are fitted on the instrument panel. Three of these meters are furnished for check purposes and are operated from the same shunt, the shunt being fitted in the negative busbar between the machines and the feeders.

The control panels are of cast iron and form the front section of the bottom cubicles. On these panels are mounted the operating handles for controlling the circuit breakers and busbar isolating switches. Practically no exposed part projects beyond the surface of the panel, other than the operating handles. The instruments are of the vertical edgewise type, and are arranged for mounting behind the panel, a suitable slot with glass front being provided in the panel for these meters. The instruments themselves are carried on porcelain insulators fitted to the back of the panel casting.

The starting gear on the 800-KW. rotary sets is of the controller type, the machines being arranged for tap starting. These controllers are mounted at the end of the machine frames and direct on the main floor of the sub-station, the connections being taken straight down and carried on the basement floor. With regard to the larger set in Erimus sub-station, this rotary is of the self synchronising type, the starting gear consisting of two oil switches mounted in the transformer chamber and operated direct from the switchboard gallery. One switch is for the main rotary connections and the other for the starting motor. The operating mechanism for these oil switches is of the signal lever type, the operating shafts being carried on the underside of the basement floor.

In conjunction with this latter starting gear an operating handle is provided for controlling the series switch on the D.C. side of the rotary converter; this handle is mounted alongside the operating handles of the starting switches, and a system of interlocks is furnished for these three units, arranged so that: (1) before closing the starting motor switch the other two switches must be "off"; (2) before closing the main oil switch the starting switch must have been closed; (3) the closing of the series switch automatically opens the starting switch.

In conjunction with this starting gear an instrument panel is fixed alongside the operating handles. This panel contains an A.C. voltmeter to indicate that the rotary is in synchronism before closing the main starting switch. A D.C. voltmeter is also fitted to indicate the voltage of each rotary before closing the series switch.

In connection with the 800-KW. rotary sets, field splitting switches are provided of the remote controlled type arranged for operating direct from the switchboard gallery. These switches are mounted in the basement floor in the same structure as the main series switch supplied in connection with each rotary. This structure consists of marble panels completely covered in with expanded metal screenwork. The operating handles for controlling these switches are mounted on cast-iron pedestals fixed immediately in front of the D.C. control board.

The rheostats for the rotaries are mounted in the basement floor, and are controlled by operating handwheels fixed on the machine control panels, bevel gearing being provided for coupling up the control handwheel on the switchboard gallery to the rheostats in the basement.

Fig. 23.—Electric Locomotive Drawing Load.

Digitized by Google

Each sub-station is connected to the overhead track wires by four positive feeders consisting of paper-insulated bitumen-sheathed single-wire armoured cables, each of ·5 sq. in. section, laid in wood troughing run in with bitumen. There are two negative cables at each sub-station connecting the track rails to the negative busbar, these cables being similar in size and type to those used on the positive side. A hand-operated travelling crane is fitted in each sub-station.

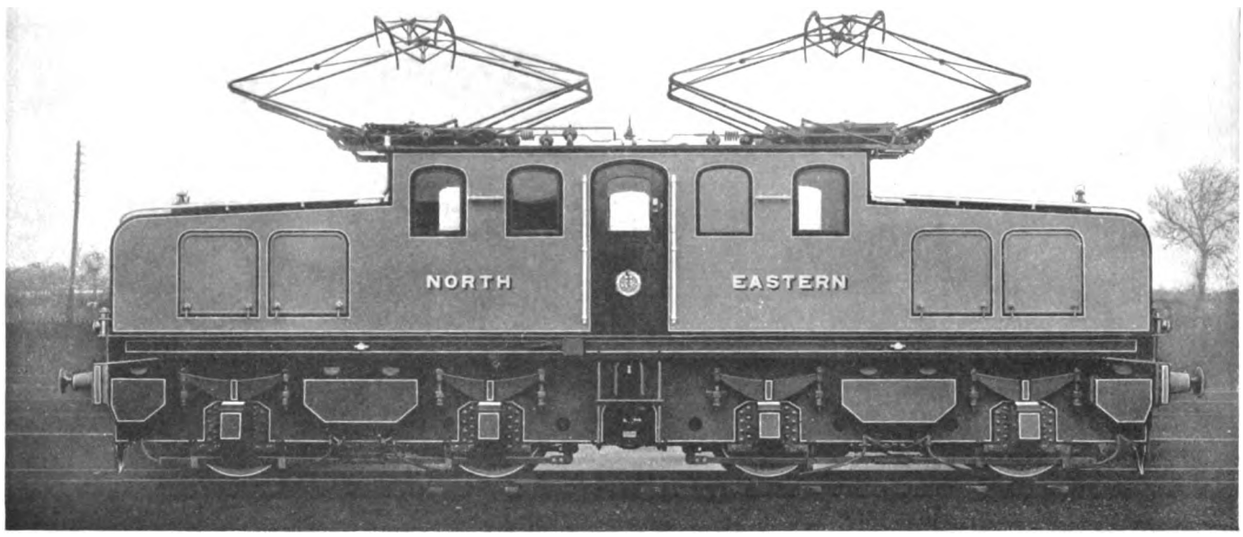


Fig. 24.—72-Ton Electric Locomotive with Four-Motor Equipment.

LOCOMOTIVES.

The freight locomotives were designed and built at the N.E.R. locomotive works at Darlington, the electrical equipment being supplied and fitted by Messrs. Siemens Brothers, Dynamo Works, Limited, Stafford. They are designed to haul trains weighing 1,400 tons at a speed of not less than 25 miles per hour on the level. Fig. 23 shows a locomotive coupled to such a train. Other illustrations show various details and the general appearance of the engines, and below is a detailed description. The work was carried out under the direct supervision of the chief mechanical engineer, Mr. Vincent L. Raven.

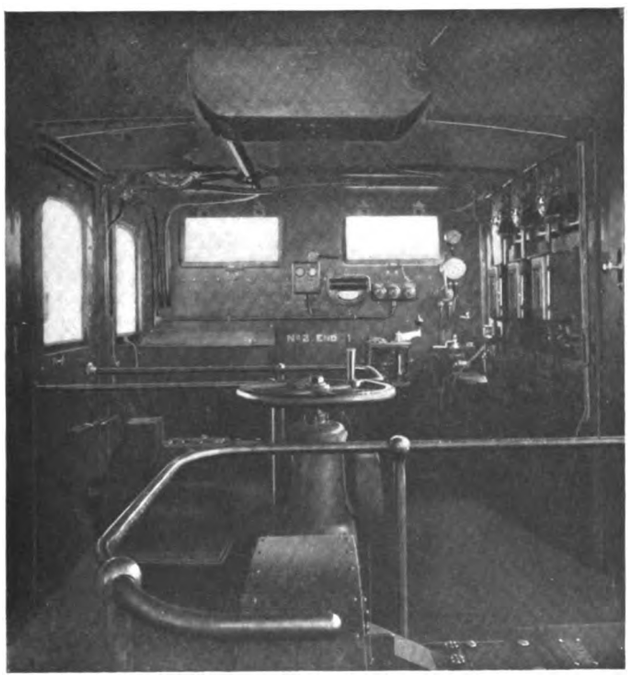


Fig. 25.—Interior of Locomotive Cab.

The engine may be described as an articulated truck locomotive in which the tractive effort is transmitted through the truck frames. The cab with sloping ends is supported on the centre of each truck by a strong steel casting, which embodies the centre pin bearing and side rubbing surfaces. These castings are securely bolted and rivetted to the plates of the cab platform, which consists of four beams secured to plates at the top and bottom. The transome between the truck frames at the centre is built up of plates and angles securely rivetted to the side frames of the truck. On the centre of the transome is a steel casting with which the centre bearing mentioned above engages. Rubbing pieces are fitted at each side, which bear on the rubbing surfaces mentioned above. The centre pin at No. 1 end is a good working fit in its bearings on the centre of the transome. At No. 2 end provision is made for creeping up of the trucks when passing round curves, but no allowance for movement transversely. The buffers are carried directly on the truck frames.

The trucks are connected by means of a buffer coupling, and arranged for lateral movement with vertical rigidity; the coupling is made with a slotted hole for a drawbar to pass through. The trucks are securely held together by means of this drawbar and a spring, which can be adjusted (the compression of the spring being $\frac{3}{8}$ in. per 7 tons load) to act as a connection between the two trucks. This spring cannot be subjected to heavy compression, resulting from buffing action, as the buffer part of the coupling between trucks receives the buffing stresses directly through the truck frames without subjecting the centre pins and platform to any stress other than those required to carry the weight of the cab apparatus on them.

The sloping ends are partitioned off from the cab, and contain the resistances, contactors, motor cut-out switches, multiple cut-out switches, and all high tension electrical apparatus. Entrance to each sloping end can be obtained through doors which are normally locked.

Digitized by Google

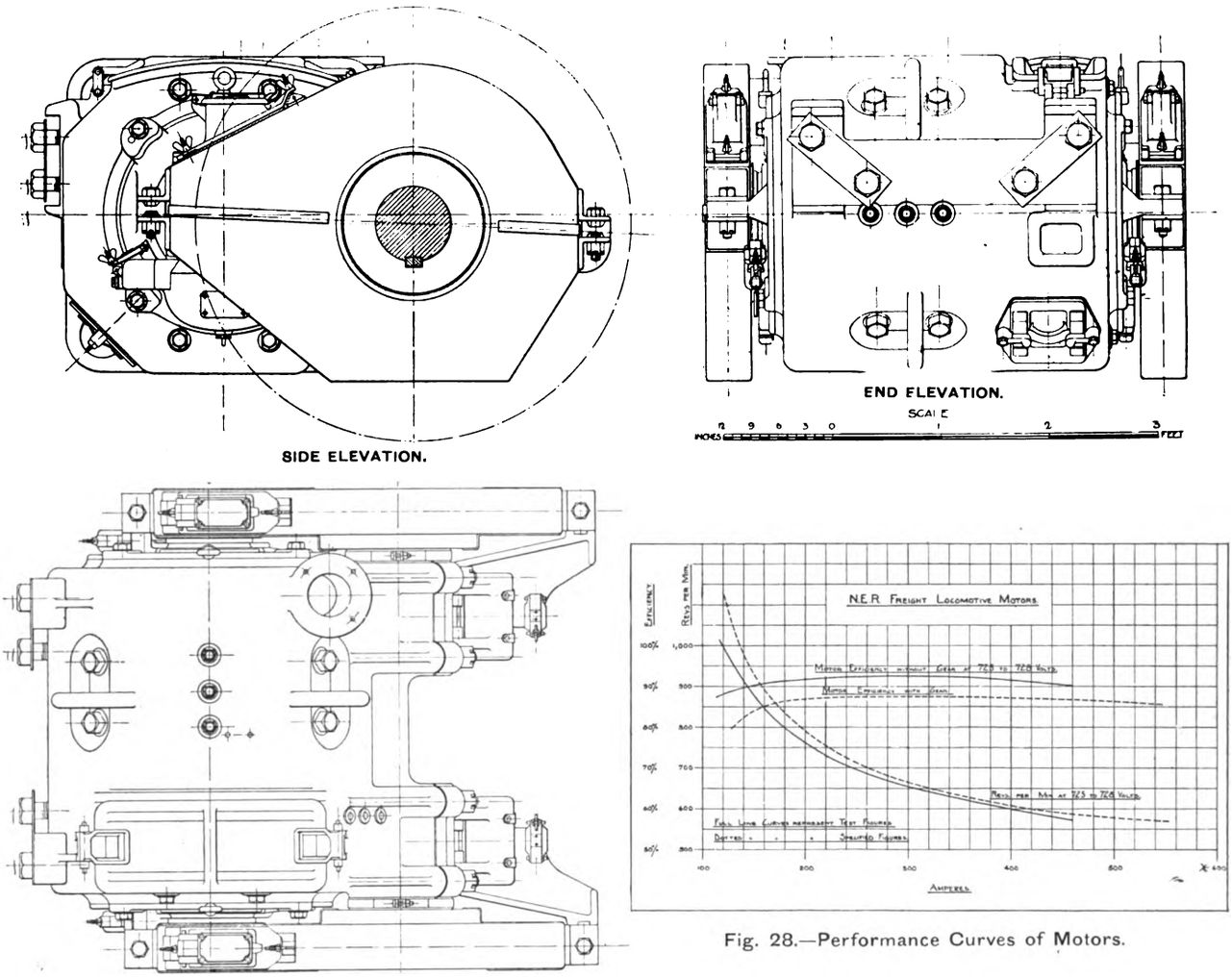


Fig. 26.—Outline of the Motor.

Fig. 28.—Performance Curves of Motors.

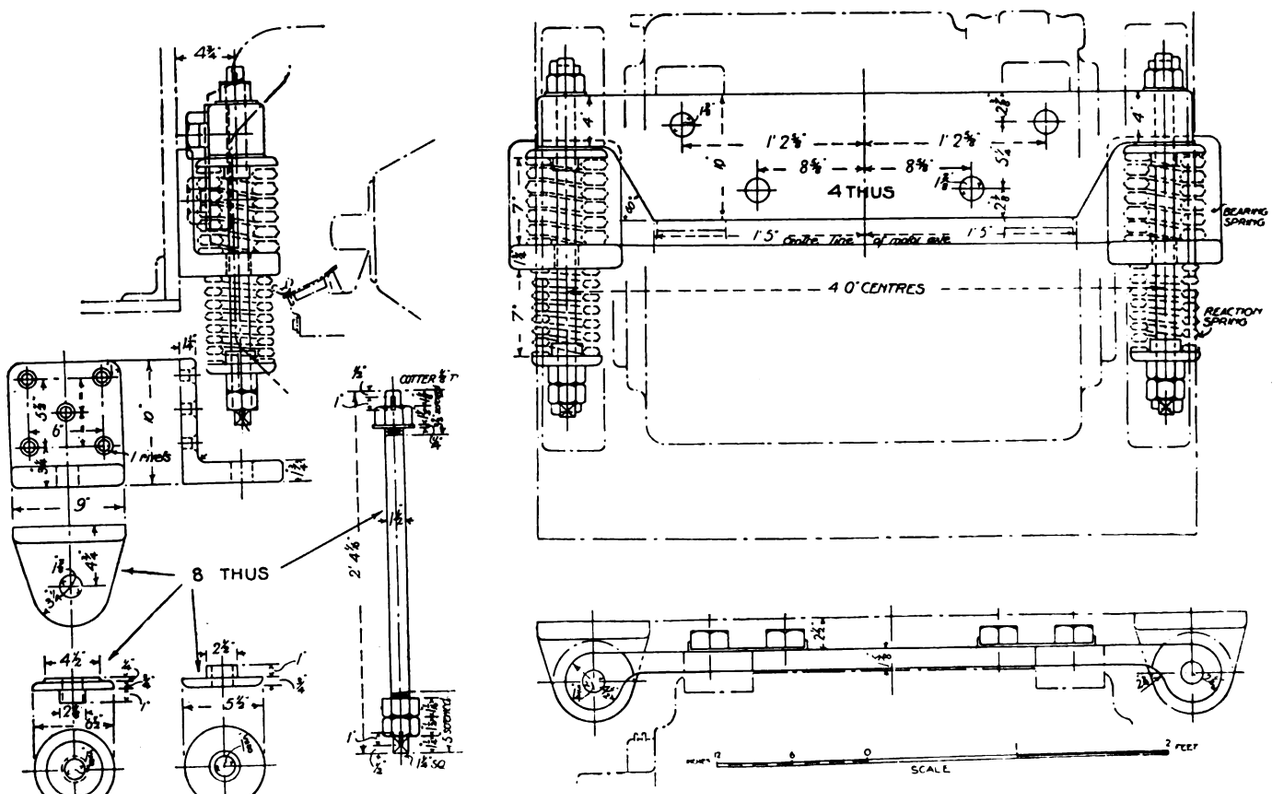


Fig. 27.—Details of Motor Suspension.

Digitized by Google

The bow collectors on the roof of the cab are raised and maintained in connection with the contact wire by compressed air. A cock is fitted on the air system, the removable handle of which forms the key of the doors mentioned. This handle is so arranged that it can only be removed when the cock is in the exhaust position, so that it is impossible to open the doors of the sloping ends while the bows are in contact with the overhead wire.

In the cab, two master controllers are fitted, one at each end (Fig. 31). The cab also contains all auxiliary switches for controlling the air compressor and two dynamotors described later, and for lighting and heating. It further contains the control valves for the Westinghouse brake and for air sanding. In the centre of the cab there is a vertical hand wheel for the hand brake (Figs. 25 and 31). The dynamotors are securely fixed to the floor, the switches, &c., being placed on the sides of the cab and weather boards.

The principal dimensions and particulars of the locomotives are set out in tabular form below :—

	Tons.	Cwts.	Lbs.
Weight of electrical equipment, inclusive of motors	24	5	0
Do. of mechanical parts	50	3	0
Do. of motors without gear wheels and gear cases	3	3	0
Do. do. with gear cases and gear wheels ...	3	13	24
Total weight of mechanical and electrical apparatus	74	8	0
Approximate height of centre of gravity	4 ft. 6 in.		
Main dimensions of motors—Axial length over windings	$24\frac{13}{16}$ in.		
Do. do. over core	$11\frac{11}{16}$ in.		
Do. diameter of armature	$21\frac{5}{8}$ in.		
Do. diameter of commutator	$18\frac{7}{64}$ in.		
Do. length of commutator	$7\frac{3}{8}$ in.		
Do. number of segments	195		
Do. air gap	$\frac{15}{64}$ in.		
Speed of motors at normal loco. speed of 25 miles per hour	787 revolutions per minute		

Dimensions of Mechanical Parts.

	Ft.	In.
Length over buffers	39	4
Height from rail to centre of buffers ...	3	5
Height of cab roof from rail	11	$6\frac{1}{4}$
Height of trolley wearing strip from rail when down	13	$1\frac{15}{16}$
Width of trolley wearing strip over horn ends	5	$10\frac{7}{8}$
Width of cab	7	$6\frac{1}{4}$
Width over footplate	8	4
Total wheel base	27	0
Wheel base of truck	8	9
Centres of trucks	18	3
Diameter of wheels	4	0
Diameter of wheel seat on axis ...	$8\frac{1}{4}$ in. × $7\frac{5}{8}$ in. long	
Diameter of axle for spur wheel seat	$8\frac{5}{16}$ in. × $5\frac{1}{2}$ in. long	
Diameter of journals	$6\frac{3}{4}$ in. × 13 in.	
Motor suspension bearings on axle	$7\frac{7}{8}$ in. × $13\frac{13}{16}$ in.	
Springs—laminated, 3 ft. 6 in. span, 18 plts., 4 in. × $\frac{1}{2}$ in.		

Cab and sleeping ends constructed of steel channels, plates, and angles.

Under-structure 8 in. × 6 in. beams, 8 in. × $3\frac{1}{2}$ in. channels, and $\frac{1}{2}$ in. plates.

Trucks—articulated.

Truck frames—steel plates $1\frac{1}{4}$ in. thick.

Truck drag plates are flanged and rivetted up securely to frame plates.

Truck transome are built of plates and angles (steel) with cast-steel centre piece fitted on centre to receive centre pin on under-structure, also side bearers.

The motor equipment of each locomotive consists of four totally enclosed motors, each driving an axle through single reduction twin gearing. The gears are machine cut with straight teeth of the involute pattern, the face dimensions of the spur wheels and pinion being $3\frac{15}{16}$ in. A pinion is mounted on each end of the armature shaft, and meshes into a corresponding gear wheel mounted on the running wheel axle, the gear ratio being 1 to 4·5. Fig. 26 shows an outline of the motor with the gearing and gear case. The motors are suspended by means of a crossbeam suspension bar, with bearings and reaction springs (Fig. 27). These, with the motor suspension bearings on the axle, provide the motors with four points of suspension.

The four main motors are fitted two in each bogie, and are each wound for 750 volts, the pair of motors in each bogie being connected permanently in series. The four main motors of each locomotive thus form two units, which are controlled on the usual series-parallel system.

Each motor is capable of developing 275 brake horse-power at a speed of 20 miles for one hour with forced ventilation. The motor equipment is capable without injury of exerting a torque sufficient to skid the wheels under any conditions of rail, and will exert an average pull of 28,000 lb. at the tread of the wheels when starting under normal conditions of rail. The maximum pull at the tread of the wheels is, of course, considerably greater than this.

The motors and gearing are designed to run at a speed of 45 miles per hour without exceeding the limits of safety, but the normal speed on the level when hauling a train of 1,400 tons is 25 miles per hour. The equipment is so designed that each locomotive is capable of performing four round trips in twelve hours, each consisting of a trip from Shildon to Newport with a train of 1,400 tons, followed by a trip from Newport to Shildon with a train of 800 tons, the distance of each trip being about 18 miles. The locomotives are able to start a train of 800 tons from rest on a grade of 1 in 100, and accelerate to normal running speed.

A novel feature is the ring lubrication on the motor shaft. The gearing is enclosed in a welded sheet-iron case fitted with a syphon wick oil lubricator. Sight doors are fitted on the gear case, so that the condition of the gears can be regularly examined. The air for ventilating the motors is supplied from fans driven by the dynamotors, which are described later. In order to avoid the use of a flexible pipe between the fan air duct in the base of the cab structure and the motors, a special form of spring sliding gland is employed. The fans furnish air to the motors at low pressure through pipes to a box fitted between the top and bottom plates of the platform, the gland above mentioned being fitted on this box. The air inlets to the fans are at the end of the platform, a trough being formed in the cab under structure to convey the air from these inlets. Provision is also made to draw air to the fans from the cab if necessary. The normal quantity of air passed through each motor case is 700 cubic feet per minute.

Fig. 28 gives the performance curves of these motors as ascertained from shop tests.

The general arrangement of the control wiring is shown in Fig. 29. Two master controllers are fitted in the cab, one at each end. Notching up can either be carried out by hand or automatically. The automatic arrangement consists of a spring which is wound up by the controller handle, the speed at which the controller drum follows the handle being governed by a step by step escapement movement.

The maximum current taken at each step is limited by a limit switch fitted in the sloping ends of the cab, which on the current rising beyond a predetermined limit, closes the circuit of a small magnetic interlock, which locks the escapement mentioned, holding the drum of the controller until the current has fallen to the required value. In addition to the above, by means of a catch inside the controller, which, when lifted,

Digitized by Google

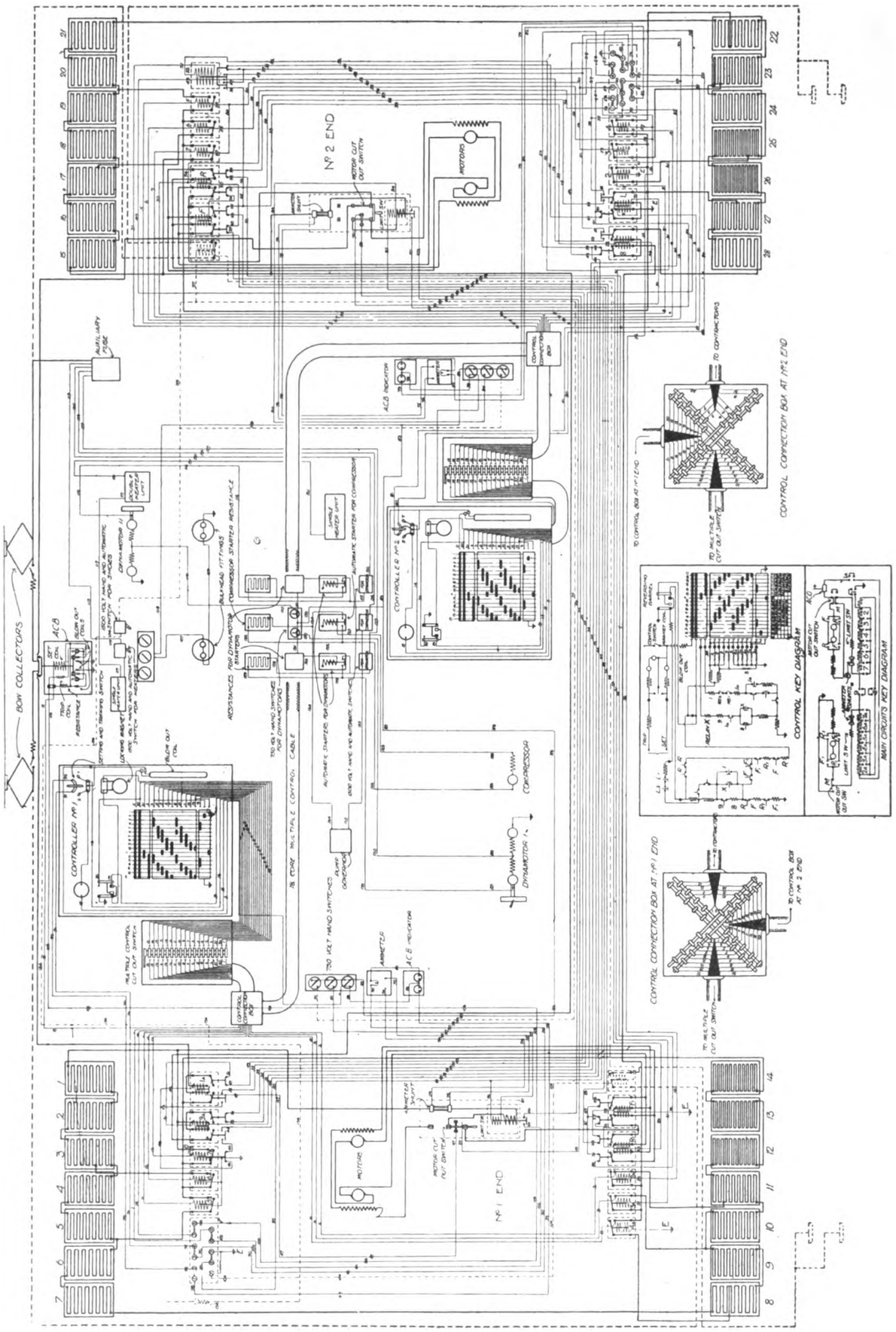


Fig. 29.—Diagram of Locomotive Connections.

Digitized by Google

disconnects the spring and escapement action, the automatic arrangement described can be thrown out of action and notching performed by hand.

An acceleration switch is also provided, so that in special circumstances the adjustment of the limit switch mentioned can be altered by short-circuiting the turns of an opposing coil, thus allowing of a larger current for accelerating under special conditions.

Each master controller is fitted with the usual reversing barrel, the handle of which can only be removed when in the "off" position. When left in this position, the reversing handle locks the main handle. There is also fitted on the master controller a small spring switch, by means of which the automatic circuit breaker on the locomotive can be tripped or set. This switch is also locked by the reversing

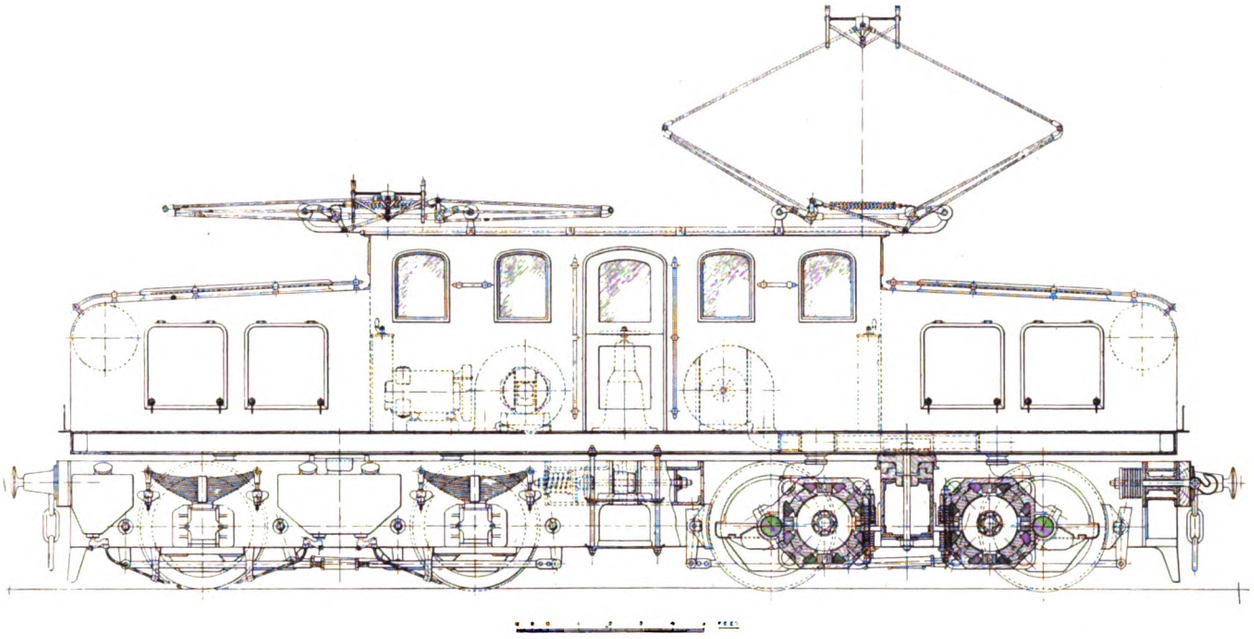
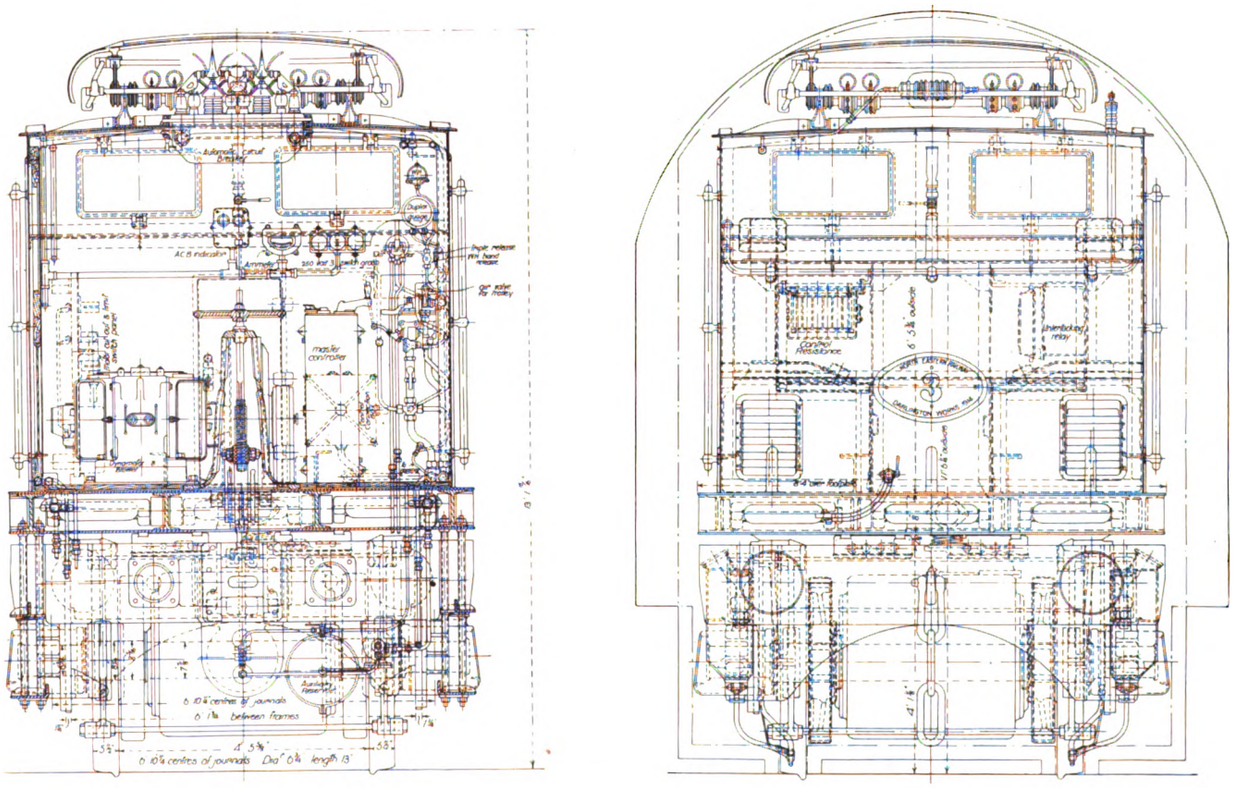


Fig. 30.—Side Elevation of Electric Locomotive, showing One Bow Expanded and the Other Collapsed.



Section through Centre of Cab.
(Looking on No. 1 end.)

End View.
(Looking on No. 2 end.)

Fig. 31.—Arrangement of Electric Freight Locomotive (Cross Section and End View).

Digitized by Google

handle in the "off" position. Current for operating the whole of the control circuits and the lighting and heating in the cab is supplied from either of the dynamotors at a pressure equal to half the line voltage.

The contactors are electrically operated, and are also fitted with auxiliary interlocking contacts to ensure their operating in the correct order. The resistances, which are of the usual cast-iron grid type, are fitted in the sloping ends, but are partitioned off from the other apparatus in these compartments.

As can be seen from Fig. 35, louvred openings are fitted at each end of the locomotive, providing natural ventilation for the resistances through rain-proof air vents on the top of the sloping ends.

The main automatic circuit breaker is fitted on the roof of the cab, and controls the current to the traction motors. This circuit breaker is fitted with horned spark gaps, which project through the roof of the cab, as can be seen in Figs. 20 and 32. The circuit breaker is operated either by means of the set-and-trip switch on the master controllers as mentioned, or by means of a mechanical hand trip fitted on the circuit breaker case. The circuit breaker, however, can only be closed by the set-and-trip switch on the master controller. Red and green lamps are provided to indicate whether the circuit breaker is set or tripped. An illuminated dial ammeter is provided at each end of the cab in front of the driver.

As mentioned above, two independent dynamotors are fitted in the cab of each locomotive. The armatures of these machines are double wound, and fitted with two commutators, the commutators being connected in series across the full line voltage. The control circuit is tapped off between the centre point and earth, so that current is obtained for these circuits at approximately half line voltage. The actual voltage when supplying the control circuits and about one kilowatt for lighting is about 710 volts. The speed is 1,500 revolutions per minute.

The shaft of each dynamotor is extended and fitted with a fan, each fan supplying ventilating air to the pair of main motors on one bogie. The rated continuous output with a 50 deg. C. temperature rise is 4·5 kilowatts. Each dynamotor is controlled by an ironclad circuit breaker and a no-arc fuse. A starting resistance is in circuit with each machine, this resistance being automatically short circuited by a relay a few seconds after the circuit breaker is closed.

A motor-driven air compressor is fitted in the cab of each locomotive for supplying air for the Westinghouse brake equipment, air sanding, raising the bow collectors, and for air whistles. The machine is capable of dealing with 50 cubic feet of free air per minute, and of raising this to 100 lb. per sq. in. pressure.

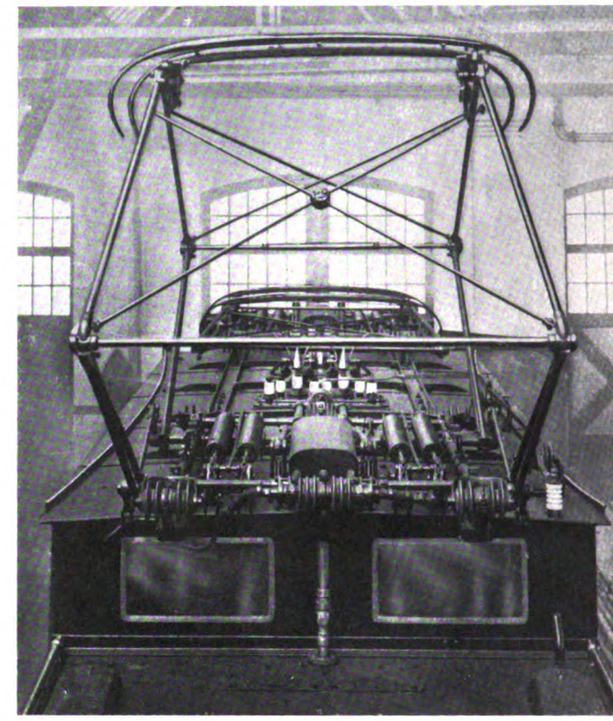


Fig. 32.—End View of Locomotive Bows.

The motor and compressor is run at line voltage, and is coupled direct in the circuit of the collector bows on the line side of the main circuit breaker, so that immediately on the bows being raised by the hand pump, as described later, the compressor starts to pump the air in the reservoir up to full working pressure. It is controlled by a circuit breaker similar to those

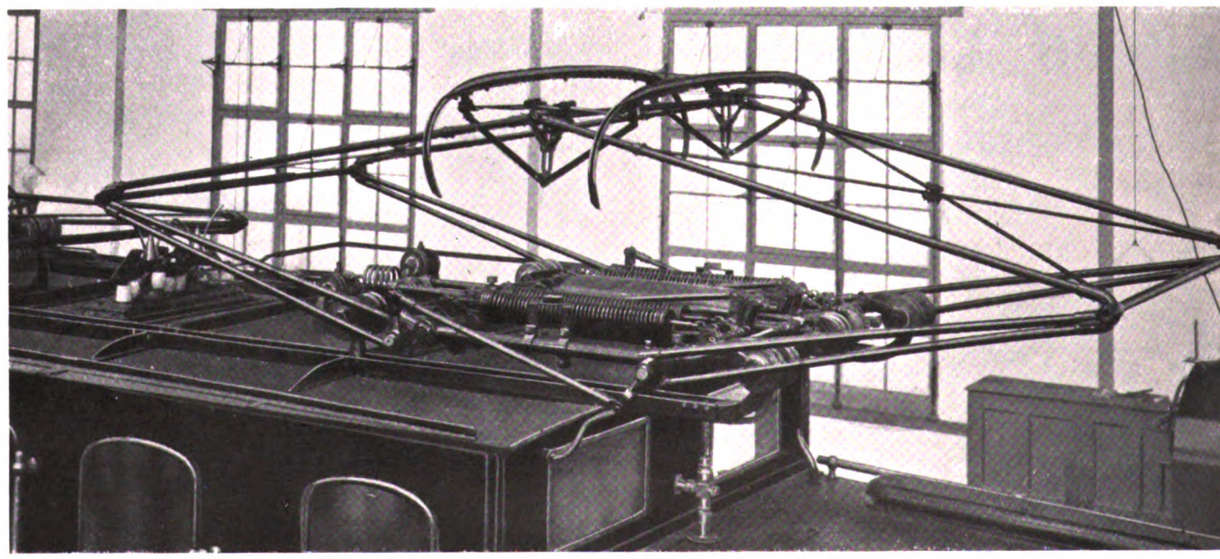


Fig. 33.—Side View of Locomotive Bows.

Digitized by Google

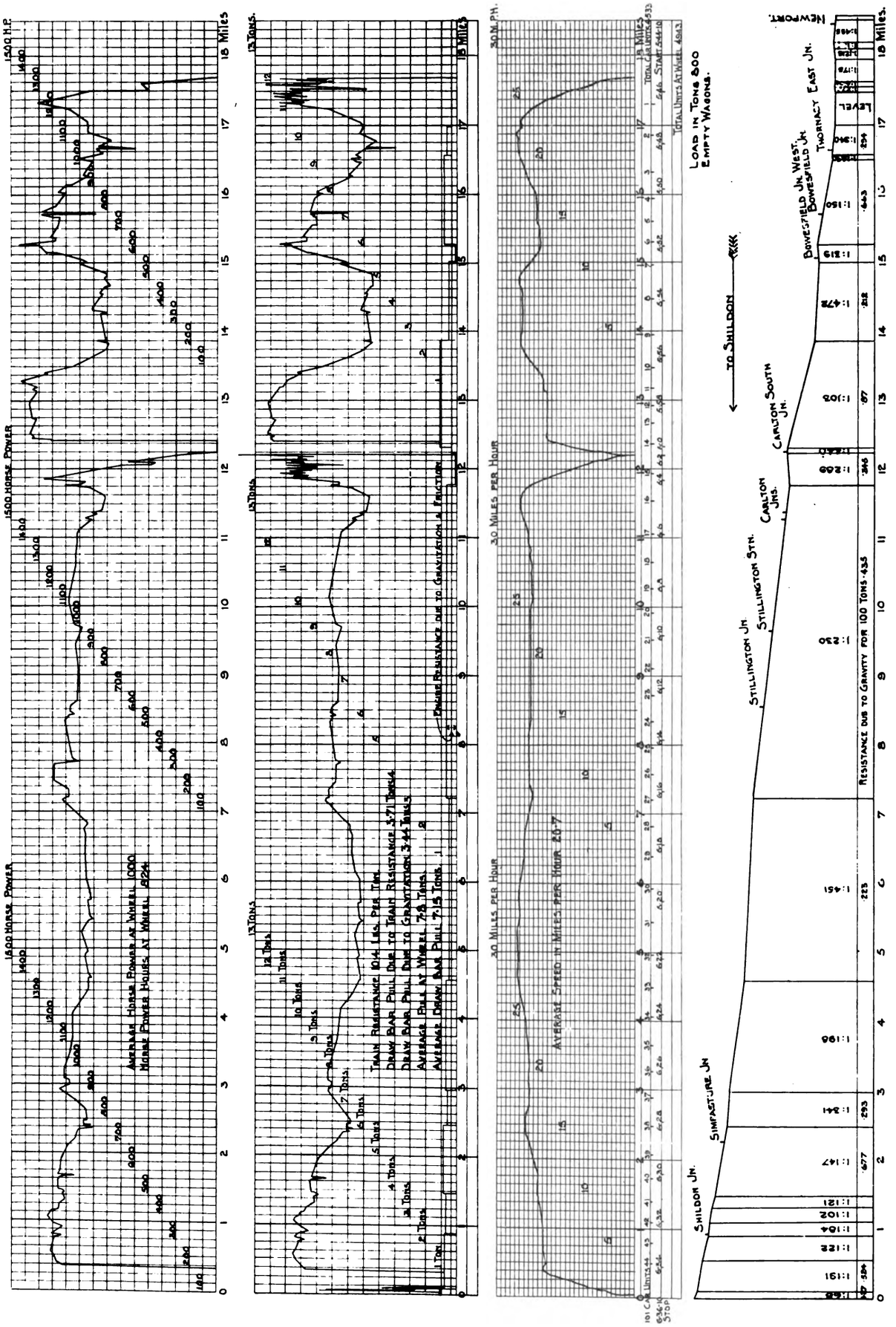


Fig. 34.—Performance Curves and Diagram of Gradients.

Digitized by Google

controlling the dynamotor circuits, a starting resistance being provided and short circuited by an automatic relay in the same manner, but in this case the relay is fitted with a time limit arrangement to extend the starting time. An automatic governor is provided for the compressor, and is so arranged that the motor circuit is opened when the air pressure rises to 100 lb. per sq. in., and closes again when the pressure falls to 80 lb. per sq. in.

Two bow collectors are provided on each locomotive. These can be seen in position on the roof of the cab in Figs. 32, 33, and 35. Each collector consists of a hinged pantograph built up of steel tubing, the whole being supported off the cab structure by strong corrugated insulators. Fig. 33 shows a side view of one of the collectors in position, and Fig. 32 shows a general view of the top of the cab, showing both bow collectors in position, one being collapsed, the other raised to the full extent. Each collector has two bows, each fitted

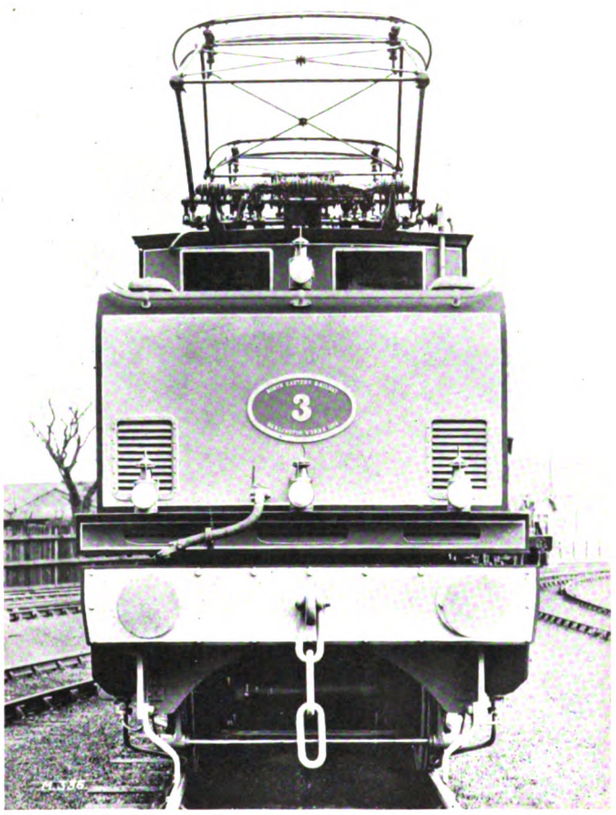


Fig. 35.—End View of Locomotive.

with an aluminium rubbing strip making contact with the overhead contact wire. There are thus four rubbing strips per locomotive, which, with the double contact wire, makes eight points of contact. Each of the two collector bows on a pantograph is attached to it by two separate leaf springs, so that they provide for any small irregularities in the level of the contact wire independently of the vertical movement of the pantograph itself.

A hand pump is provided by means of which the bows are raised at the commencement of the day's working if no pressure is available in the reservoir. By means of the control cocks in the cab, either one or both of the bows can be raised or lowered. Each pantograph is raised and maintained in contact with the overhead wire by means of an air cylinder, so that in the event of a failure of the air pressure, the bows are automatically lowered. The air cylinders raise the pantographs through springs which can be seen in the views, and which maintain an even pressure against the contact wire notwithstanding variations in its height.

An existing engine shed at Shildon was adapted for the use of these locomotives, a sufficient portion being electrically equipped for the purpose. An automatic circuit breaker is provided controlling the whole of the shed equipment, and each engine stall is controlled by an independent isolating and earthing switch, so that work can be safely carried out on the roof of any locomotive without interfering with the operation of locomotives in adjacent stalls.

Electric Locomotive Tests.

Tests have been carried out recently with one of the electric locomotives. Several journeys were made between Shildon and Newport, a train of 1,400 tons of laden wagons being taken from Shildon to Newport and a train of 800 tons, consisting of 92 empty wagons, hauled from Newport up to Shildon with stops on certain of the heaviest grades. The 800-ton train was stopped and started on a grade of 1 in 103. The maximum draw-bar pull during the tests reached 16 tons, the average speed on the run up from Newport to Shildon being 18·3 miles per hour, the maximum speed being 26 miles per hour. Up a grade of 1 in 230, which is 4½ miles long, the 800-tons load of empty wagons was hauled at an average speed of 23 miles per hour. The locomotive also proved capable of hauling the 1,400-tons train on the level at 26 miles per hour. The general operation of the locomotive proved satisfactory in all respects throughout the test.

Principal Firms Engaged in the Work.

The following were the principal firms responsible for carrying out the work :—

Locomotives.—North Eastern Railway Company, Darlington.

Overhead track equipment and electrical equipment of locomotives.—Siemens Brothers' Dynamo Works, Limited, Stafford.

Steelwork and brickwork for the sub-station buildings.—R. Blackett and Son, building contractors, Darlington.

High tension switchgear in sub-stations.—Contractors, the British Thomson-Houston Company, Limited, Rugby ; sub-contractors, A. Reyrolle and Company, Limited, Hebburn-on-Tyne.

Rotary and static transformers for the sub-stations.—Contractors, the British Thomson-Houston Company, Limited, Rugby ; sub-contractors, the British Westinghouse Electric and Manufacturing Company, Limited, Manchester.

Cranes in sub-stations.—Herbert Morris, Limited, Loughborough.

20,000 and 11,000 volt overhead transmission lines and cables supplying the sub-stations.—The British Insulated and Helsby Cables, Limited, Prescot.

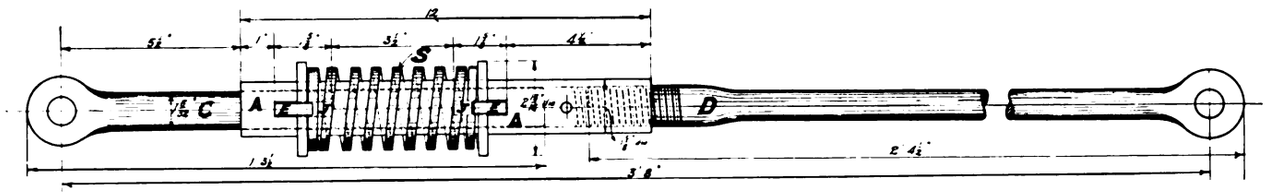
Mr. Arthur Pollard, architect for the North Eastern Railway Company, York, arranged the order for the sub-station buildings.

We wish to add an expression of our indebtedness to the consulting engineers, Messrs. Merz and McLellan, by whose courtesy we are enabled to publish the foregoing account and illustrations of an undertaking which is not only of great interest in itself, but which, as a pioneer of electric goods service in the United Kingdom, promises important developments in the future.

Digitized by Google

HOLT'S SIMPLIFIED CONNECTING ROD FOR TRAMWAY POINTS.

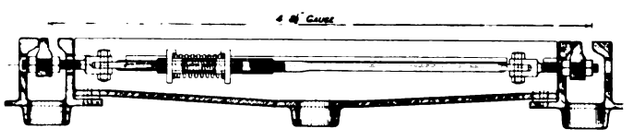
This improved connecting rod for tramway points acts as a shock absorber and adjuster. The rod has been designed to overcome the difficulty experienced in the straining and buckling of point connecting rods, and also to dispense with the right and left hand turnbuckles usually attached to these rods. Owing either to carelessness on the part of the man opening the points, or to the accumulation of mud in the tongue recess, it frequently happens that the point tongues are not opened or thrown over to the full extent, with the result that when the car wheels enter the points, the tongues are violently forced over, and either buckling or elongation of the connecting rod occurs.



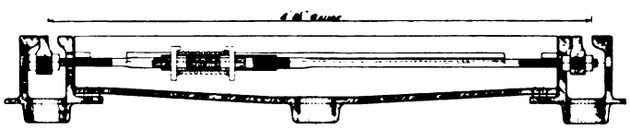
Plan of Complete Absorber.

The device designed by Mr. R. B. Holt renders either buckling or elongation of the connecting rod quite impossible.

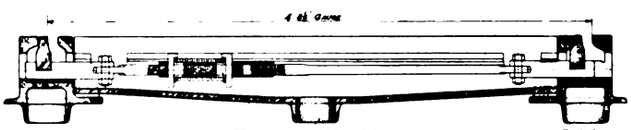
The improved connecting rod dispenses with the usual right and left hand turnbuckle; the two lengths of bar forming the connecting rod being coupled in the following manner:—A short steel tube A is passed over the ends of the bars C and D. The end of the bar D is screwed into the tube A, and the bar C is free to move inside the tube (within the limits of the slot hole). Stout keys E are passed through slot holes J in both the tube and the bar C, and these with suitable washers hold in position the spring S.



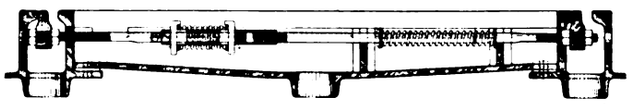
A.—Connections with Link Ends Bolted through Tongue.



B. Connections Bolted through Tongue.



C.—Connections with Tongue Working in Renewable Slides.



D.—Showing Connections to Work Automatically, Applied to either A, B or C Types.

The spring is of usual dimensions for this class of work, and will accommodate itself to the following stresses:—(1) Compression from either right or left, (2) extension from either right or left, (3) compression from both right and left simultaneously, (4) extension from both right and left simultaneously. Application has been made for a patent for the device.

INTERCONNECTION OF POWER STATIONS.

The Railway Department of the Board of Trade have sent the following communication to electric supply undertakings:—

The Central Coal and Coke Supplies Committee have had under consideration the increasing difficulty in providing for the supply of coal to important consumers, and have advised the Board of Trade that in view of the possibility of a serious shortage in the near future every practicable economy in consumption should be adopted without delay. In this connection the Board desire to call attention to the very considerable saving that can be effected by the adoption of arrangements for interconnection and joint working of electric supply undertakings, including interconnection with stations supplying tramways and railways. The Board are aware of the difficulties involved at the present time, particularly in regard to labour and materials, but they are advised that in many cases the necessary arrangements could be made at once, and they wish therefore to urge upon electric supply undertakers the necessity in the national interest of taking immediate steps to avail themselves to the fullest possible extent of the powers which exist for the purpose. Any application which may be made to the Board of Trade for their approval of such arrangements under the powers conferred on them by the Electric Lighting Act, 1909 (Section 4, Sub-section 3), and the London Electric Supply Acts, 1908 and 1910, will receive their immediate attention. The Board are prepared to assist as far as possible in cases where difficulty is experienced in securing the agreement of all the parties interested in any proposed scheme or in arranging the terms and conditions under which it shall be carried out.

Before the issue of the letter a scheme on similar lines for Lancashire and Cheshire had already been taken up by the Municipal Electrical Association of those counties, as the result of a suggestion made by Mr. J. A. Robertson, the electrical engineer to Salford Corporation, and a committee are now collecting data. The chairman is Mr. S. L. Pearce (Manchester), and the other members are Messrs. B. Welbourn (Prescot Electric Light Company), J. A. Robertson (Salford), hon. secretary, C. C. Aitchison (Rochdale), S. E. Britton (Chester), H. Dickinson (Liverpool), E. H. Edwards (South Lancashire Tramways Company), R. Blackmore (Stalybridge), J. Purrett (Lancashire Electric Power Company), S. J. Watson (Bury), P. P. Wheelwright (Blackburn), and J. A. F. Aspinall (general manager, Lancashire and Yorkshire Railway).

WHERE TRAMWAY FARES HAVE RISEN.

Reporting to Bradford Tramways Committee on a proposal to lengthen penny stages, Mr. C. J. Spencer, the general manager, says:—"The proposal to cheapen fares at the present moment is, in my opinion, very inadvisable, though I agree that under normal circumstances the proposition is in the right direction. I have made inquiries from seventy-eight towns as to alterations in fare stages since the beginning of the war, and I find that in twelve towns, including Birmingham, fares have been increased since the war started. In sixty-six towns no alteration has been made, and only in one case has any decrease in fares taken place. It would be difficult to find a commodity of any description which has not increased in price, let alone decreased, since the outbreak of war. The cost of operation of tramways has increased considerably, and gives every indication of still further increase in the future." Mr. Spencer also stated that "the total cost of operation per car-mile, including interest and sinking fund, for the year just closed amounted to 11·905d. Taking the last five years of peace, ended March 31, 1914, the receipts per car-mile averaged 11·439d., which was ·466d. per car-mile less than the expenses for the year just closed. If the receipts of war time had been the same per car-mile as the average of the previous five years in peace time there would have been a loss of nearly ½d. per car-mile on every mile run during the year, so that if the receipts per car-mile in the war period had not been in excess of the receipts in peace the undertaking would have shown a loss of £12,900. The extension of the penny fare stages under present conditions would result in a considerable loss of revenue, unless it were possible to put on additional cars to meet the extra traffic attracted. Under present conditions it would be impossible to provide cars, so that two things would inevitably happen, viz., (1) a reduction in receipts, and (2) a still further overcrowding of cars." The committee adopted the report.

Digitized by Google

PARIS MUNICIPAL TRAMWAYS.

(Continued.)

The first instalment of the description of the work of converting the Paris tramways to electric traction, which appeared in our issue of May 11, concluded with details of the types of conduit construction which were adopted in districts where overhead wires were deemed inadvisable. We now give some facts and a number of interesting illustrations of the special conduit work constructed in Allen's "Imperial" manganese steel. Up to the outbreak of the war Messrs. Edgar Allen and Company, Sheffield, had supplied nearly 200 tons of these lay-outs for the Paris tramways.

A complex example is shown in Fig. 1. It is a double junction curved to the left, type No. 4, supplied for the line Puteaux (Marché) Madeline-Carrefour Haussmann Faubourg Saint Honoré. This junction comprises, independent of track and slot points, 14 conduit crossings, 6 track crossings, 2 cast-steel frames which are fitted and bolted to crossings opposite the intersection of the slot crossings, and afterwards fitted up with paving blocks. There are also 2 cast-steel frames with lids, which are bolted on to four different castings, viz., the support for the slot point, the slot point, and the two interior or exterior groups of conduit castings. The radii of the outer curve for this layout are 120 metres at the broad end, running into 30 metres radius points, and the distance from the toe of the points to the intersection of the further crossing is 22·457 metres. The total weight of these crossings is 8½ tons. The longest crossing is 4·5 metres, and is V-shaped. This view is typical of numerous layouts curved both to right and left.

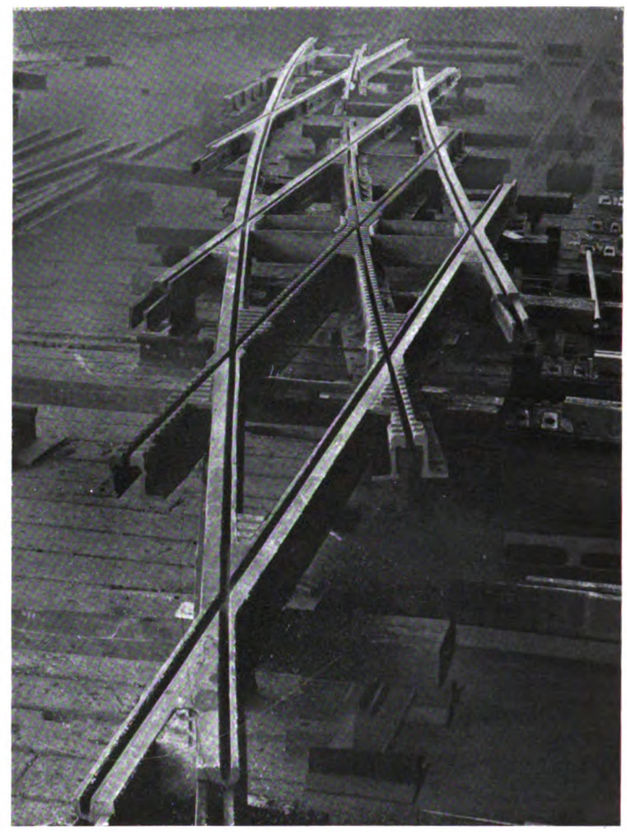


Fig. 1.—A Double Junction Curved to the Left.

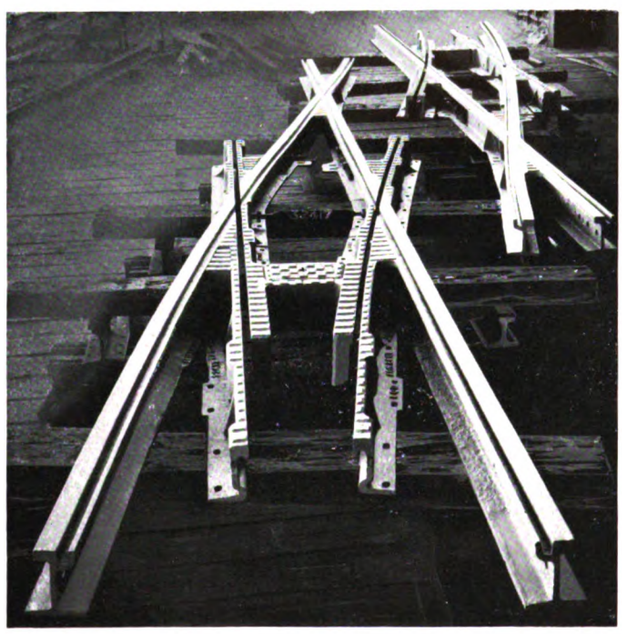


Fig. 2.—A Right Hand Cross-over of 30 Metres.

Fig. 2 represents a right-hand crossover, 30 metres radius, with a total weight of 3¼ tons. A right-hand crossover of 50 metres radius is shown in Fig. 3. The length of the track points is 3·940 metres, with a tongue 2·913 metres long. The total weight of this job, consisting of two track crossings, 8 slot crossings, and 2 pairs of points, is 6 tons. Fig. 4 is a crossover (90 deg. double track over double track) for Line 14 and E.P. Place de la Bastille. The weight is 84 cwt. A similar crossover (37° 14′) for Line No. 6, crossing

Fig. 3.—A Right Hand Cross-over of 50 Metres Radius.

Digitized by Google

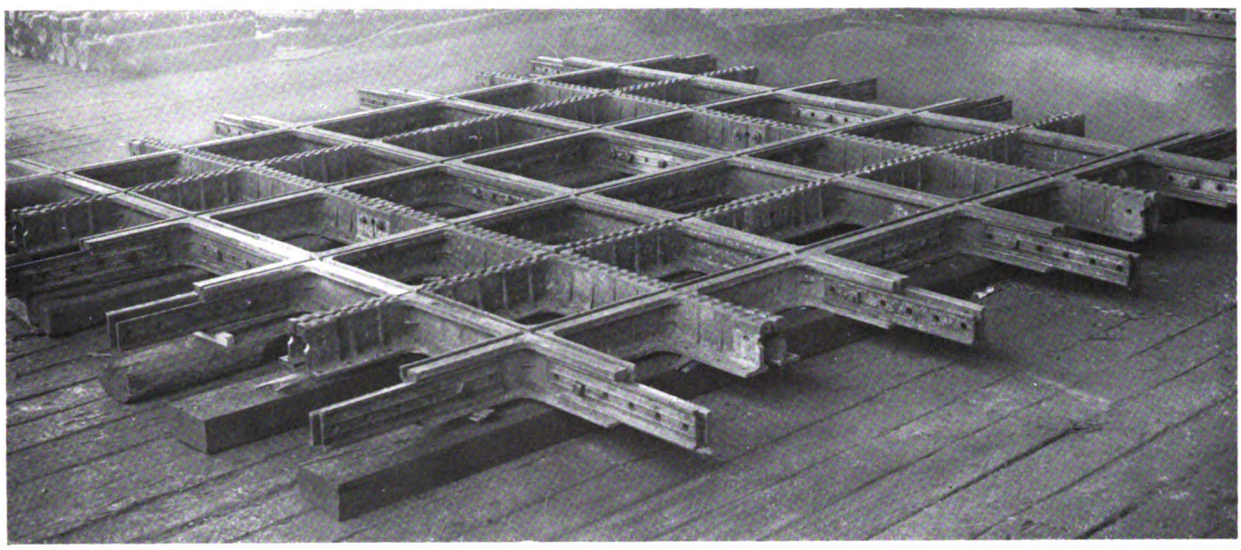


Fig. 4.—Double Track over Double Track Cross-over.

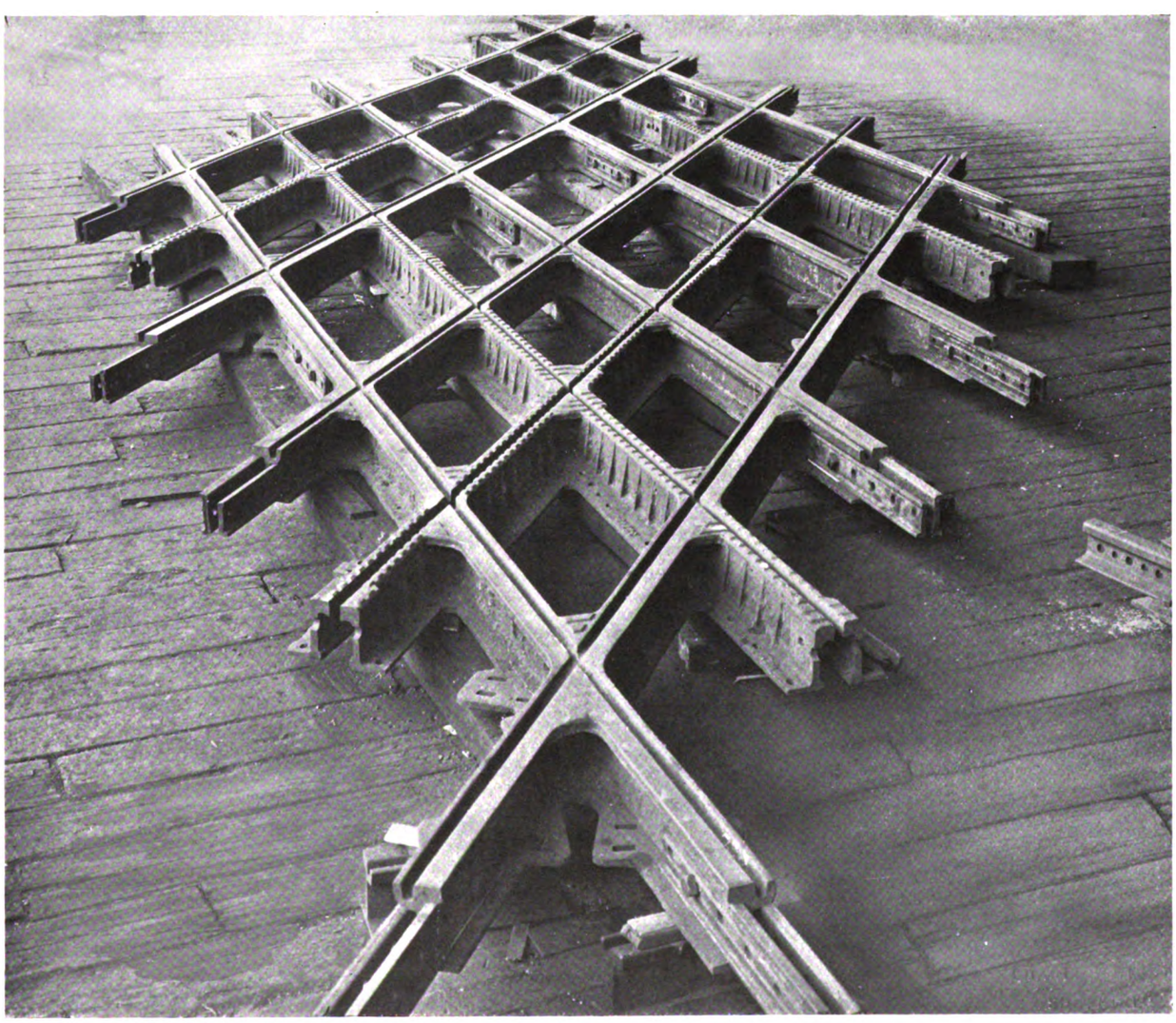


Fig. 5.—Double Track over Double Track Cross-over.

SPECIAL CONDUIT TRACKWORK—PARIS MUNICIPAL TRAMWAYS.

Digitized by Google

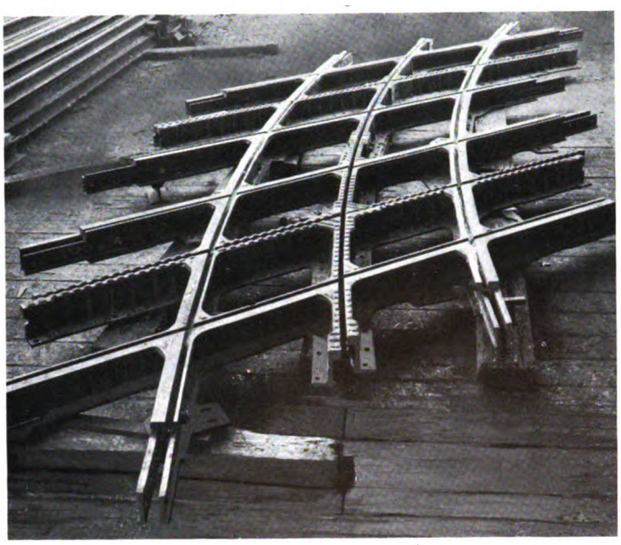


Fig. 6.—Curved Cross-over over Two Tracks.

Reaumur Turbigo, is shown in Fig. 5. The weight is $7\frac{1}{4}$ tons. The work shown in Fig. 6 was supplied for Line No. 1, Cours de la Reine (Terminus de l'Alma). The weight is $3\frac{1}{4}$ tons. The three latter castings are curved to a radius of 20 metres.

Numerous crossovers, varying in angle from 37° 14′ to 90 deg., are represented by these views and by the drawing (Fig. 7), which gives a clear idea of the fitting up, and shows the centres of the yokes, which are fixed diagonally, with two additional supports at each slot intersection. About 24 yokes and eight centre supports are required for this type of crossover. If the crossovers are over the angle of 50° 45′, the method of supporting the castings is different, a yoke No. 6 being fixed under each track rail. Thus, for every star or group of four crossings, four No. 6 yokes are required, together with a centre support. This method of support is also applicable for curved crossovers (Fig. 8). The most difficult type of casting to make for these layouts is the V-shaped slot crossing (Fig. 1), owing to the difficulty in contraction on account of the preponderance of metal at one end and the thin nose at the other. All castings have to be ground to depth and section. The pockets for the tiebars have also to be carefully ground, so that the nuts shall not foul the plough. The slot fishplates must make a good joint with the adjoining rail or casting.

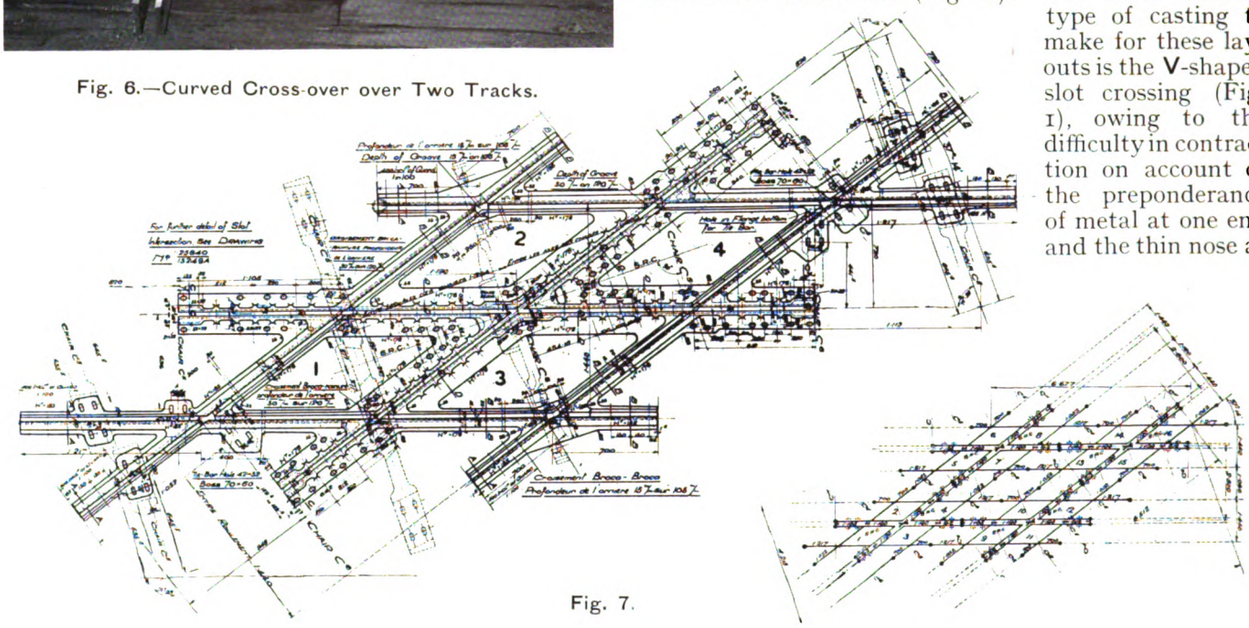


Fig. 7.

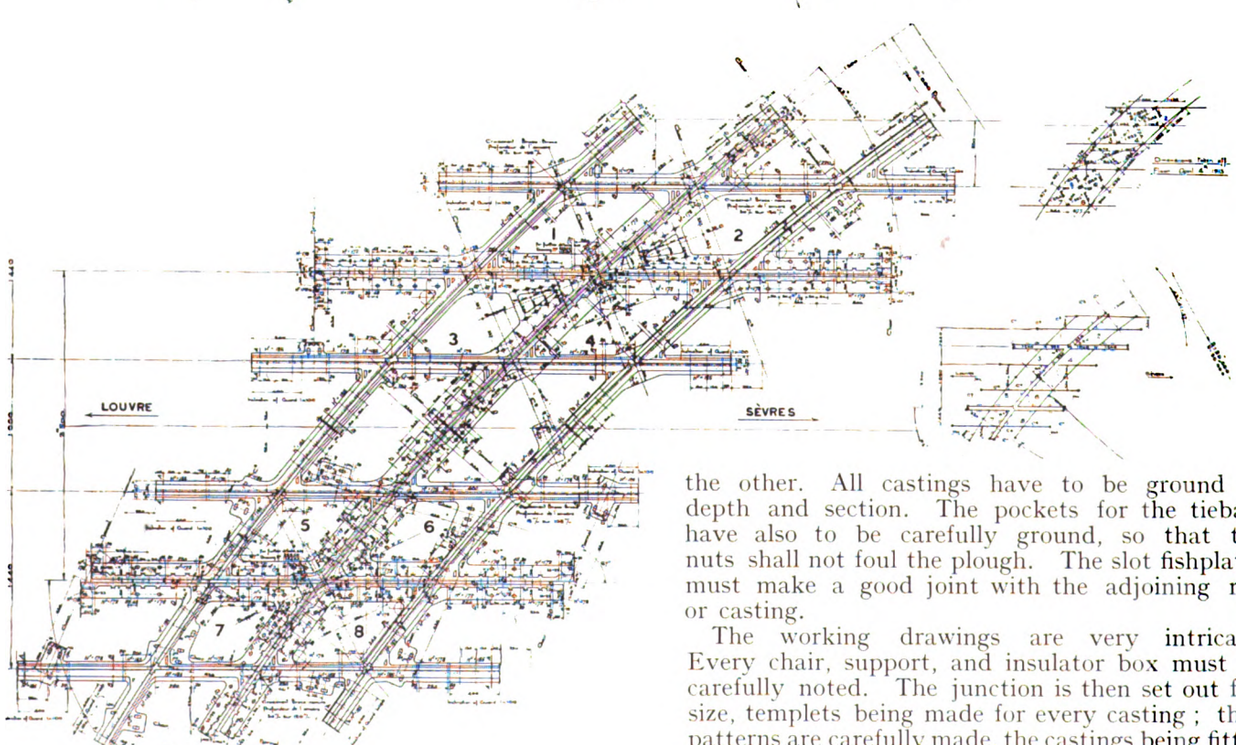


Fig. 8.

The working drawings are very intricate. Every chair, support, and insulator box must be carefully noted. The junction is then set out full size, templets being made for every casting; then patterns are carefully made, the castings being fitted together and checked before being sent away.

Digitized by Google

The Thomson-Houston Company have endeavoured to standardise the crossovers as far as possible, so as to reduce the enormous amount of pattern making which would otherwise be required.

CARS WITH FRONT ENTRANCE AND CENTRE EXIT.

The need for time saving in loading and unloading cars, which has so often been urged in these pages, is being more keenly felt everywhere. Recently we reported what had been done at Newcastle to improve the means of entrance and exit, and we have only recently learned that similar methods are being tried in Ayr. In the United States one of the latest car designs provides a front entrance and centre exit. *Electric Traction*, of Chicago, gives the following description of 50 cars of this type recently ordered for their Rochester lines by the company known as the New York State Railways. These cars will be of all-steel construction, with plain arched roof, and will be 50 ft. long over all. They will seat 54 persons.

The roof will be made up of a steel plate covered with cork and canvas, this being one of the latest types of roof construction. The posts and carlines will be made of steel T-iron—a single piece of iron forming two posts and one carline, the upper part being bent to the proper curve of the roof. Grab handles for standing passengers will be supported from brackets on the side posts, and these handles, together with all pipes, rails, and stanchions, will be coated with white enamel.

The front entrance will be divided by a stanchion and dividing rail, which will permit two passengers to enter side by side, and will greatly facilitate loading in the crowded districts during the rush periods. The front entrance will be enclosed in folding doors manually operated and controlled by the motorman. A folding step is also operated in conjunction with the doors. The centre entrance will also permit of two or more persons leaving the car side by side. There will be a well at the exit and two sliding air-operated doors controlled by the conductor.

The fare box and conductor's stand will be located just forward of the centre exit. All passengers will pay their fare as they pass the fare box—those taking seats or standing in the forward part of the car not depositing the fare until they leave the car at the centre exit on reaching destination. Passengers going to rear of car on boarding or at any time during the journey will deposit fare as they pass the fare box in going from the front to the rear of the car.

The floors will be of two thicknesses of seasoned maple with a layer of building felt between. The upper floor will be of grooved boards running crosswise of the car. The floors will be ramped slightly from the bolster position to the centre well with one step from the car floor into the well. The distance from the floor of the well to the street will be 13 in. The motorman's cab will be enclosed.

The seats will be longitudinal. There will also be a seat around the rear end of the car. The space between the car floor and seat cushions will be enclosed by a thin plate of sheet iron, leaving only the centre portion of the car floor open, which will greatly facilitate the keeping of the car floor in a clean condition.

Cars will be lighted by a circuit of five 93-watt tungsten lamps with velvet reflectors. Each car will be equipped with five ventilators attached to the centre of the roof, and the lamp fixture will be attached to the centre of each ventilator.

The car bodies will be mounted on single trucks, with 5 ft. 2 in. wheel base, 26 in. wheels, 4 in. axles, and semi-elliptical springs. The trucks will weigh approximately 4,300 lb. The electrical equipment will consist of four GE-258-A motors with GE-K-12 controller, with contactor line switches. Straight air-brake equipment of the National Brake and Electric Company with National M-W-1 compressors (10 cu. ft. capacity) will be installed.

The cars will be equipped with Hale and Kilburn seats, Cincinnatti Car Company's standard ventilators, and Consolidated Car Heating Company's forced ventilation hot-air heaters.

BELFAST TRAMWAYS MANAGERSHIP.

Six of the 42 applicants for the position of general manager of the Belfast Corporation Tramways, the vacancy having been caused by the resignation of Mr. Andrew Nance, have been selected for further consideration. The applications came before a meeting of the Tramways and Electricity Committee held on May 17, when they were referred to a sub-committee for consideration and report. The six candidates remaining on the list are:—Mr. James Scott Duncan Moffet, general manager of the West Ham Corporation Tramways; Mr. William James M'Combe, tramway manager of Hull; Mr. Robert Stuart Pilcher, general manager and engineer to the Aberdeen Corporation Tramways; Mr. Joseph Fitzalan Simpson, engineer and general manager, Preston Corporation Tramways; Mr. Joseph W. Dugdale, late tramways general manager and engineer, Oldham; and Mr. Richard Henry Wilkinson, general manager and engineer, Corporation Tramways, Huddersfield.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

ARRANGEMENTS FOR THE CONGRESS.

For the annual congress, to be held on Friday, June 30, the following arrangements have been made:—

2.30 p.m.—Annual general meeting, Westminster Palace Hotel, S.W.

3.0 p.m.—Paper by Mr. W. Tuke Robson, A.I.E.E., general manager, Southampton Corporation Tramways, on "Tramway Transit and Comfort: A Plea for the Passenger." Discussion to follow.

4.0 p.m.—Visit by special motor omnibuses to the London General Omnibus Company's Training School at Milman Street, Chelsea, where members will be received by Mr. H. E. Blain, operating manager of the London General Omnibus Company and the Underground Railways.

Inspection of class-rooms, drivers' and conductors' courses, mess-room, clothing stores, etc., and cinematograph hall, where special films will be exhibited showing London traffic scenes with special reference to rules of the road for tramcars, omnibuses, and other traffic, methods of training, etc.

This will be followed by tea, during which Mr. Blain will give a short address on "The Safety Movement."

7.30 for 7.45 p.m.—Members' dinner at Trocadero Restaurant.

The Hon. Arthur Stanley, M.P., will preside at the dinner, which is intended to be an informal one.

At the annual meeting the names of the following gentlemen will be submitted for election to the Council:—Mr. H. M. Sayers, consulting engineer; Mr. I. Bulfin, general manager, Bournemouth Corporation Tramways; Mr. W. Vincent Edwards, general manager, Hastings and District Tramways Company; Mr. G. M. Harriss, general manager, Dublin United Tramways Company; Mr. A. W. A. Chivers, British Electrical Federation, Limited; Mr. A. H. Beatty, director, Messrs. Balfour, Beatty and Company.

MUNICIPAL ELECTRICAL CONFERENCE.

The twenty-first annual general and other business meetings of the Incorporated Municipal Electrical Association will be held on June 22 and 23 at the Institution of Electrical Engineers, London. On the first day the programme will be as appended:—

10.0 a.m. (1) Presidential address. Mr. Alex. C. Cramb, borough electrical engineer, County Borough of Croydon.

(2) Paper on "Boiler-house design," by Mr. W. W. Lackie, past president, engineer and manager, Glasgow Corporation Electricity Department.

2.30 p.m. (1) Paper on "Area of supply from an economic standpoint," by Mr. H. S. Ellis, borough electrical engineer, South Shields.

(2) Paper on "The application of electric power to agriculture," by Mr. W. T. Kerr, city electrical engineer, Hereford.

On the second day the routine business will be transacted.

YORKSHIRE TRAMWAY MANAGERS' ASSOCIATION.

INSPECTION OF THE BRADFORD TROLLEY BATTERY VEHICLE.

A meeting of this association was held in Bradford on Thursday, June 1, the following members being present:—Messrs. C. J. Spencer (Bradford), J. B. Hamilton (Leeds), E. Cross (Rotherham), W. E. Nicoll (Barnsley), J. V. Moinet (Scarborough), R. H. Wilkinson (Huddersfield), W. McGibbon (Ossett), J. W. Hame (York), E. A. Paris (Dewsbury), H. L. White (Cleethorpes), J. W. Galloway (Halifax), J. D. Caird (Halifax), J. Parkinson (Dewsbury), C. J. Jewell (Wakefield), H. England (Wakefield).

Luncheon was provided at the Great Northern Victoria Hotel, and afterwards the members adjourned to the Tramway Offices, when a discussion was opened by the Chairman (Mr. C. J. Spencer), who gave a description of the new trolley battery vehicle which is referred to elsewhere in this issue. An interesting discussion followed on the transit of goods in general, and the adaptability of this vehicle in particular for delivery of goods to places adjacent to tramway tracks.

Among other questions discussed were trailer cars, women car drivers, and the liability of serious accidents through hand brake handles slipping. The members then journeyed in a special car to Rawson Square, and there inspected the trolley battery vehicle.

A hearty vote of thanks to Mr. Spencer for so kindly making such complete arrangements for the meeting, and the facilities he had given for a demonstration of the new vehicle, was accorded.

Large Increase of Trailer Cars in London.—It was stated at a meeting of London County Council on May 30 that there are now 116 trailer cars in use on the Merton, Norbury, New Cross, and Woolwich routes. The women conductors in the Council's employ at the date mentioned numbered 739, and the number is being increased.

Digitized by Google

THE
Tramway and Railway World

FOUNDED IN 1892 AND PUBLISHED BY
THE TRAMWAY AND RAILWAY WORLD PUBLISHING COMPANY, LIMITED,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

SUBSCRIPTION:

THE TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum

THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

FOR ALL PLACES ABROAD—Thirty Shillings per annum.

Single Copies—One Shilling (Postage, 2 pence—Abroad, 5 pence).

THE EDITORIAL AND PUBLISHING OFFICES OF
THE TRAMWAY AND RAILWAY WORLD
ARE AT AMBERLEY HOUSE, NORFOLK STREET,
LONDON, W.C.

Telegraphic Address: "TRAMIGRO, LONDON."
Telephone No.: GERRARD 2948.

LONDON, JUNE 8, 1916.

A Mineral Railway Electrification.

An absolute novelty so far as this country is concerned, and one of the few examples of installations of the kind to be found anywhere, is the electrification of the mineral line of the North Eastern Railway Company from Shildon to Newport. An examination of the detailed description and numerous illustrations, which appear in this issue, will show that the equipment presents a number of departures from ordinary practice. In the first place, direct current at a pressure of no less than 1,500 volts is used. Hitherto the highest direct-current voltage employed for traction in England has been 1,200 volts, namely, on the Manchester to Bury line of the Lancashire and Yorkshire Railway, recently described in our pages. We except the notable high-tension installation on the Bury to Holcombe Brook line, as this was constructed for experimental purposes. The Manchester to Bury equipment includes a third-rail conductor, but the Shildon-Newport line has overhead wire conductors after the style—though differing in detail—of those used for high-tension single-phase traction. In America two important installations of electric traction on the high-pressure direct-current method for heavy trains have been put into operation recently. On the Butte, Anaconda, and Pacific Railway the working pressure is 2,400 volts, and on the Chicago, Milwaukee, and St. Paul Railway it is 3,000 volts. The latter is the same pressure as is used on the experimental line between Bury and Holcombe Brook, and if the use of direct-current traction on railways in this country extends, the voltages employed will no doubt tend to approximate to this pressure. Though the electric locomotives used on the Shildon-Newport line are small compared to some American ones, they are the most powerful in use in this country. Each weighs 74 tons, and is designed to haul a train of 1,400 tons at a normal speed of 25 miles an hour on the level. There are four motors of 275 H.P. each. The conditions on the line are very favourable, as all the loaded coal trains go down from Shildon to Newport, over most of which distance there is a falling gradient. The up trains as a rule will be lightly loaded or empty. In the case of the two American railways already mentioned, the conditions are different in various respects. In particular, provision has to be made for hauling the enormous mineral trains characteristic of American practice. The bigger the train the lower the costs per ton-mile—such seems to be the experience in the United States. The average weight hauled by a Butte-Anaconda locomotive is 2,100 tons, while the maximum appears to be 3,700 tons. The machine is a double unit weighing 144 tons. The Chicago-Milwaukee locomotive weighs 250 tons, has a continuous rating of 3,000 H.P., and draws a train of 2,230 tons up considerable gradients. Reports show considerable economies as compared with steam traction; the trains are heavier, and the speed is greater. The North Eastern Railway Company have an advantage similar to that enjoyed by the two American railways mentioned, as they are able to purchase energy at a cheap rate from great electric power companies. It may be hoped that the directors will in the near future make public a comparison of the financial results of electric and steam operation on this line. Among other points to which special attention may be directed is the description of the sub-station equipment. The rotary converters are arranged two in series to produce the pressure of 1,500 volts, and the switch-gear presents some unusual features, as

Digitized by Google

on the direct-current side the above-mentioned voltage has to be provided for instead of the usual 500 or 600 volts. The working of the installation will be followed with keen interest.

Conveyance of Goods. Now that the Government are taking definite steps to regulate the consumption of petrol, in order to prevent waste, we cannot refrain from again calling attention to the question of using tramways for goods transport. If the requisite facilities had been available, an immense service in economical transportation would have been rendered to the nation during the progress of the war, while the money sent out of the country for the purchase of thousands of American road motor vehicles, to meet the shortage of horses and the congestion of the railways, would have been available for national use. Among the greatest gainers would have been the railway companies, whose opposition has been mainly responsible for the failure of tramway owners to link up their lines with goods termini. When once accomplished, this would have led to the extension of the rails into the yards of numerous industrial undertakings. In later years, smaller works would have found the battery runabout an economical means of bridging the space between their wharves and the track. Electric cranes on the goods wagon would have swept away the street obstruction created by the out-of-date vehicles of the railway carriers. Indeed, goods transit by tramway would have afforded a capital field for the adoption of modern methods, from the box carrier to automatic sorting at suitably designed and adequately equipped and approached clearing houses. Added to this we should now have had the benefits that promise to accrue from Mr. J. C. Spencer's experiment at Bradford with a combination railless trolley and battery vehicle, using the overhead wire of a tramway where one exists and relying elsewhere upon the automatically boosted accumulators. This innovation, which is described and illustrated elsewhere in this issue, is the outcome of the lack of both railway and private cartage facilities. Throughout the country there have been delays of weeks and months in the delivery of minerals and goods, and this has occurred at a time when a committee of managers are controlling the principal railways for the Government. For this and other reasons tramway operators should regard it as incumbent upon them to take steps to utilise their lines for goods traffic in towns where the local Act gives the power. We are glad to notice that Mr. J. B. Hamilton is preparing a report for his committee on the prospects of making such use of the Leeds tramways, especially in districts situated long distances from railway and goods termini. Mr. Hamilton rightly observes that by utilising the tramways to convey minerals and goods to those localities a saving would be effected in cost, while the wear and tear of the highways would be reduced. Probably at this juncture it might be possible to advance the scheme for cotton transport by tramway between Liverpool and Manchester, a project that has twice occupied the attention of the tramway authorities of the Mersey Port and of intervening districts. In London a great amount of traffic might be taken off the roads by utilising the tramways for goods conveyance ; the lines pass most of the chief railway depots.

The Summer Time Act. Traction undertakings will be the gainers in two ways by the operation of the Summer Time Act, which took effect at 2 a.m. on May 21, when clocks were advanced an hour beyond Greenwich time. In common with all users of artificial light, the undertakings will experience a reduction of expenditure on illuminants, and the saving will be further enhanced by the lessening of the deterioration of incandescent electric lamps entailed by the varnishing of the globes to comply with the lighting restrictions. It was chiefly in order to effect economy in lighting that the Act was accepted by Parliament at the instance of the Government. From the realisation of that aim the country will gain the still greater advantage of lessening the demand upon the reduced output of coal from the mines, with their smaller number of workers. The importance of releasing coal, so that it can be used for the supply of power to munition works and to serve the needs of the Allies abroad, requires no emphasis beyond stating that it is a consideration more forcible than any that has been advanced since the late

Digitized by Google

Mr. Willett suggested the introduction of the Daylight Saving Bill in 1907. The appeal for economy that is now pre-eminent had no influence prior to the outbreak of the war. This is shown by the fact that during an investigation into the probable effects of the Bill by a Parliamentary Committee, it was stated that the annual saving for the whole country would amout to £2,500,000, inclusive of £92,000 by the railways and £10,000 by the tramways department of the London County Council. No doubt the greatest obstacle to the innovation was the difference between railway time in this country and on the Continent. That hindrance has now disappeared, consequent upon almost universal acceptance of the measure. An unlooked for difficulty has arisen now that the measure has come into force. We refer to the higher charges for lighting announced by some electricity companies owing to the reduction in their revenue. This result, however, may be attributed to the special circumstance of the dearness of fuel at this period. For a second form of profit from the Act transit authorities will probably be justified in looking for an increase of pleasure traffic during the extra hour of daylight now at the disposal of the workers. Several considerations might be cited why people are likely to be influenced in that direction ; the anticipated gain would be greater if the Bill had been enacted earlier. This defect is capable of being remedied if the war is unhappily in progress next year, for the Act provides that in any subsequent year of the conflict its clauses may be revived for such period as may be fixed by Order in Council. Judging by the manner in which the Act has been welcomed, and the lack of inconvenience resulting from it, the question of its retention on the statute book after the war is not likely to be challenged.

Manchester-Bury Railway Electrification.—The electric railway service on the Manchester and Bury section of the Lancashire and Yorkshire Railway was inaugurated on April 17. A full description of the work, together with 56 illustrations, appeared in our issue of January 13 last. The new service has effected a considerable reduction in the journey time.

Electrical Trades After the War.—The Board of Trade have appointed the following committee to consider the position of the electrical trades after the war, with reference to international competition and to report what steps, if any, are necessary or desirable in order to safeguard the position :—Hon. Sir C. A. Parsons (chairman), Mr. J. Annan Bryce, M.P., Mr. T. O. Callender, Mr. James Devonshire, Mr. B. M. Drake, Sir John Snell. Communications should be addressed to the Secretary, Electrical Trades Committee at 7, Whitehall Gardens, S.W.

TRADE AFTER THE WAR.

The Government have made no advance during the past month, so far as public announcement is concerned, in regard to fiscal arrangements after the war. The statement which Mr. Chamberlain, Secretary for India, made in the House of Commons on May 18 was merely a repetition of what some of his colleagues had said before—encouraging as far as it went, but unsatisfactorily vague. The whole subject is to be examined from a new standpoint, and the British representatives are to go to the International Economic Conference unfettered. Dissatisfaction has been expressed with the composition of the two trade-after-the-war advisory committees appointed by the President of the Board of Trade to advise as to the iron and steel and the textile industries. In short, the Government attitude is not so hopeful as it might be, nor is the position rendered more encouraging by the fact that Mr. Harcourt is taking Mr. Runciman's place at the Board of Trade, while the latter is recovering from a breakdown brought on by overwork and strain. Mr. Harcourt has so far given little indication that he realises the great danger with which British trade will be confronted after the war, unless well considered action is taken beforehand.

On the other hand, invaluable help is being given in awakening public opinion by Mr. W. M. Hughes, Prime Minister of Australia, who continues his indefatigable campaign in this country in favour of fostering British Empire trade, and of excluding German trade. Perhaps one of his most notable utterances was that addressed to a patriotic labour demonstration in the Queen's Hall, London, on May 10. It was a trumpet call for the national organisation of our industries, and it was also a demonstration of the hopelessness of the old policy of *laissez faire*. Even more striking was the enthusiastic reception of Mr. Hughes at Manchester where, in the home of Cobdenism, he denounced the old policy as outworn and hopeless. This was on May 26, or only three days after the announcement was made that 932 members of the Manchester Chamber of Commerce had voted in favour of a policy of trade protection against our enemies, and only 234 had voted in opposition. The significance of these figures can scarcely be overlooked even by the Government.

The country is indeed waking up from its long slumber, and if the Government fail to heed the portent there will come a sudden day of reckoning. Another significant matter is the proposed formation of a comprehensive body to be called the United British Industries Association. Backed by many of the most influential companies, firms, and associations connected with British industry, it is hoped that this body will embrace practically all the industries of the nation, and that it will be able to exercise a powerful influence for good on the trade policy of the nation. The formation of a Ministry of Commerce is likely to be one of the points pressed. The national organisation of industry for which Mr. Hughes contends ought to be within the reach of such an association. The chemical manufacturers of the country are also forming a new organisation of their own ; the promotion of technical education will be one of the main objects of this body. Mr. T. C. Elder, of the "Beama," continuing his addresses on trade after the war, particularly engineering trade, lectured under most influential auspices at the Royal Technical College, Glasgow, on May 16. Meetings of various classes of traders are being held all over the country for the purpose of considering and taking action which will prevent a recurrence of German trade domination and promote British Empire

Digitized by Google

commerce and also trade with our Allies. All the indications are that if necessary the hands of the British Government will be forced by the nation.

THE ECONOMIC CONFERENCE.

Mr. Bonar Law has elucidated to some extent what will be the position of the Allied Governments' representatives at the forthcoming International Economic Conference, which, as now arranged, will be convened at Paris on June 14. He told a deputation from the Associated Chambers of Commerce that the British representatives—who, it is highly satisfactory to know, will include the Prime Minister of Australia—will go to the conference on precisely the same footing as the members of any of the other Governments. The British representatives will go with a desire to evolve some policy of advantage to the Empire.

Probably by way of a preliminary to the conference, a gathering took place in Paris in the end of April of what is called the International Parliamentary Committee of Commerce. It consists of a number of the members of each of the Legislatures of the allied countries, and it has been discussing various commercial and trading questions with the object of future safeguards against the predatory Empires. Notwithstanding the adjournment of Parliament until June 22, this month promises to be marked by a steady advance toward the formation of a definite policy. The most stubborn free traders are giving up their uncompromising attitude under the constant pressure of events, and the policy which we have so long and so stupidly followed, to our own great detriment, must soon be abandoned.

EDINBURGH AND A MUNICIPAL TRAMWAYS MANAGER.

On May 31 the sub-committee of Edinburgh Tramways Committee considered a motion by Bailie Boyd as to the advisability of appointing a tramway engineer during the remainder of the tramways lease. Mr. Campbell, the burgh engineer, stated that he was able to discharge the duties at the present time, as much of his own work was in abeyance. The sub-committee decided to defer the question. Councillor White submitted a motion recommending the Corporation to appoint a tramways manager and to establish a tramways department. He urged that an expert should be secured to devote his whole time to the work in view of preparing for the transfer of the undertaking and its extension, as well as deciding upon the method of traction. The sub-committee remitted the matter to the Tramways Committee.

THE REBELLION IN DUBLIN.

EXPERIENCES OF THE UNITED TRAMWAYS.

On Easter Monday, April 24, at 12.30 p.m., immediately after the Sinn Fein rebels had occupied the principal public buildings in Dublin, the Tramways Company

Tramway Standard Pierced by Shell.

started withdrawing their cars from the streets, and at 2.30 p.m. most of the vehicles were returned safely to the different depots. In Sackville Street one of the Howth cars was stopped and the motorman and conductor were covered with revolvers and ordered to leave. An endeavour was made to upset this car by hand to form a barricade for Earl Street, but the attempt failed. Then a charge of dynamite was put beneath it and exploded, but it did little or no harm. Eventually this car was burnt owing to the adjoining houses having caught fire and fallen upon it. Another

Tramcar Destroyed During the Insurrection in Dublin.

Digitized by Google

car was caught on the South Quay and was also burnt in the same way. Minor damage to four or five of the cars was done by rifle fire.

There was no direct attempt to damage cars except for the rebels' "military" purposes. One motorman, however, in running his car out of the danger zone, was seriously wounded, while another employee, who was coming from a city depot, was killed by rifle fire from the General Post Office. Several tramwaymen were wounded by stray bullets in the vicinity of their homes.

The trolley wires suffered most severely; several miles were brought down all over the city by rifle fire. Several tramway standards were damaged by shell fire. The accompanying photograph shows one at the corner of O'Connell Bridge and North Quays, from which it will be seen that a shell passed right through the pole. Subsequently this standard, as well as the others damaged, were filled up with concrete reinforced with steel rods on site.

The day after the outbreak the Sinn Feiners surrounded the power station, and eventually entered and ordered the employees to leave. All the intruders carried revolvers, and some of them displayed a revolver in one hand and a dagger in the other. They gave the engineer on duty an hour to clear out, under penalty of death, and ordered that the whole of the works were to be shut down. This was exactly what the management had decided to do themselves. The rebels were apparently satisfied that their wishes were carried out, as they did not return. The staff, however, kept in occupation of the station in its shut-down state throughout the whole of the fighting, notwithstanding the heavy rifle fire in the district, which was one of the most stubborn in resisting the troops and was the last to be conquered. No attempt was made to do any damage to the power station.

On May 2, immediately after the burning of the General Post Office, the fires in the power station were restarted, and on May 3 the greater part of the undertaking was in working order. Sniping was very prevalent throughout the whole of tramways area, which made it uncomfortable for the men repairing the overhead wires, but by May 5 practically every feeder was temporarily repaired and the full car service was restored as far as the military authorities would allow it to be run. General Maxwell had drawn a cordon around the whole city, and would not allow the cars to pass more than two bridges—one on the south side and one on the north side.

The amount of the damage to the rolling stock, including the two cars destroyed and injuries to six other cars—mainly breaking of glass by rifle fire—did not much exceed £1,500. The total damage to the overhead equipment amounted to about £500. Considering, however, the amount of property that the company owns throughout the city, such as the various depots, and the large number of cars, the shareholders may be congratulated on their good fortune in escaping so lightly. The actual stoppage of the services was from 12.30 p.m. on Easter Monday, April 24, until May 3, and this cessation of traffic constituted the company's most serious loss.

The second photograph shows the Howth car already referred to as having been burnt. This car, as well as a smaller one destroyed on the South Quay, was eventually towed home on its own wheels. The field coils were rendered useless, but the armatures are apparently not very much the worse. Notwithstanding that the metal melted from all the bearings, the two trucks are not beyond repair. No damage was inflicted on the truck as the result of the attempt to blow the car up.

HULL TRAMWAYS.

VISIT BY THE MUNICIPAL AND COUNTY ENGINEERS.

A meeting of the Institution of Municipal and County Engineers was held at Hull on May 13, when the members were welcomed by the Lord Mayor (Alderman Hargreaves), who is chairman of the Tramways Committee. Mr. F. W. Bricknell, the city engineer, read a paper descriptive of the municipal works of Hull. Adverting to the tramways, he said the power-station was now equipped for a uniform three-minutes' service. The most recent overhead equipment was carried on span wires, and he regarded the centre standards, which were used at the outset, as a mistake. During the visits to places of interest the visitors inspected tramways with special ballasted tracks on Holderness Road and Hessle Road. The tramway power-station and the electricity works were also visited.

In the course of the discussion on the paper, Mr. W. J. Steel (city surveyor and permanent way engineer at Newcastle) congratulated Mr. Bricknell on the exceedingly low cost of tramway construction in Hull. The Hull tramways were one of the cheapest undertakings as regards cost, and there were several reasons to account for that. For its population Hull had the shortest mileage of any undertaking. There was also an absence of bad gradients, the stiffest being 1 in 100, whereas if the average was 1 in 12 the best rails would wear out in four or five years. Although the bulk of the track had been in use for seventeen years, he understood that very few rails had had to be renewed.

Mr. H. P. Foster (Leeds) remarked that Hull was one of the few towns that had adopted the centre grooved rail and longitudinal sleepers. He asked whether the corrugations were superficial or deep.

In reply to a vote of thanks, Mr. Bricknell said the tramway rails were supplied by a Belgian firm, and were contracted for with the ends cut on the bevel. British firms now gave them the length of 60 ft., which they desired, and also cut the rails as required. Wood setts had long been used in the place of the expensive granite setts. He regretted that they did not put down their creosoting plant for blocks. Adverting to corrugation, he said the rails distributed the weight, and there was approximately equal wear on the two sides of the groove. The life of the track might be anything from twenty to twenty-five years. Gradients undoubtedly made a difference in the cost of maintenance, but frequent stopping and starting also had an appreciable effect.

UNDERGROUND AND L.G.O. GROUP.

THE GRAPHIC PRESENTATION OF OPERATING DATA.

At the monthly efficiency meeting of the London Underground Railway and London General Omnibus Group, held at the L.G.O.C. Training School, Milman Street, Chelsea, S.W., a paper on "The Graphic Presentation of Operating Data" was read by Mr. H. E. Beech, of the L.G.O.C. General Superintendent's Department, there being a good attendance of officials.

The chair was occupied by Mr. H. E. Blain, the operating manager, who observed that the past two years had been noticeable for the very great improvement that had been effected in the graphs and diagrams used in the department, which had enabled the huge mass of operating data to be presented in a form at once easy to comprehend and clear in exposition.

Mr. Beech's paper was illustrated by a large number of slides, commencing with some of the striking posters which have been utilised to show the various speed rates of different types of vehicles used in London transit. The subject was divided into sections:—(1) Curves; (2) vertical diagrams; (3) describers; (4) other graphical methods. Included in the first group were examples of omnibus loading diagrams, charts showing mess-room operations, the movement of employees at Woolwich Arsenal with the traffic facilities afforded, quarterly route averages in successive years and progressive averages on new routes, rotary railway charts, omnibus petrol consumption charts, and train and omnibus declaration curves. Group No. 2 included traffic analysis, loading diagrams of several descriptions, accident diagrams, diagrams showing journeys per head of population of large cities, and comparison of rapid transit facilities. Group No. 3 showed some novel forms of describers that had been perfected for such work as the allocation of vehicles from a large number of garages to different routes. Group No. 4 included different types of diagrams for plotting and checking headways, graphs showing comparison of vehicles used in different years, combined cartoons showing routes geographically with loadings on omnibus and railway facilities in the area, etc. The actual forms from which the illustrations had been prepared were laid out as exhibits, and both the inspection and criticism of the same evoked considerable interest.

The next meeting of the series will deal with "Time-Tables and Duty Sheets: Comments and Criticisms on Methods and Practice."

Digitized by Google

OLDHAM AND MEXBOROUGH MANAGERS.

Mr. Percy Priestly who has recently been appointed general manager of Oldham Corporation Tramways, served his apprenticeship with the late Sir William Allan, in Sunderland. He was for six and a half years deputy electrical engineer at the Halifax Corporation electricity works, and was then appointed general manager and engineer of Mexborough and Swinton Tramways Company.

Mr. Percy Priestly
(General Manager, Oldham Corporation Tramways).

This company was then operating its lines on the Dolter surface contact system. This method of traction became unsuitable owing to the subsidences often occurring in colliery districts, and on Mr. Priestly's advice it was replaced by the overhead trolley. The work was carried out by Mr. Priestly in the shortest possible time. Mr. Priestly also erected the whole of the overhead equipment and other construction work for the railless trolley undertaking, which was opened in August of last year, and has since proved very satisfactory in operation.

Mr. G. H. Browne who recently resigned the position of acting engineer and manager of Ilkeston Corporation Tramways and

Mr. G. H. Browne
(Manager, Mexborough and Swinton Tramways Company).

Electricity Department, to become manager of Mexborough and Swinton Tramways Company, received his technical training at the Wigan and Manchester Technical Institutions. On the presentation of a thesis on "The Conservation of our Coal Supplies" he was elected an associate of the Institution of Electrical Engineers. He served his mechanical engineering apprenticeship with the Garswood Hall Iron and Coal Company, Wigan, and later received an appointment at the Wigan Corporation power-station. After spending four years there, he accepted a position at Swindon Corporation electricity works, where he remained for five years. In September, 1911, he was appointed deputy borough electrical engineer and assistant manager of Ilkeston Corporation Tramways and Electricity Department, and in October, 1914, was appointed acting engineer and manager.

LEEDS TRAMWAYS AND GOODS CONVEYANCE.

Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways, in presenting his annual report to the Tramways Committee on May 15, observed that since October last the tramways had been utilised for carrying fireclay and coal from the Leeds Fireclay Company's mines at Harehills to their works at Wortley and Elland Road. This commencement in the carriage of goods traffic for the general public, Mr. Hamilton states, marks an important era in the development of the business of the tramways undertaking. In the local Acts of Parliament the very fullest powers for conveyance of goods, minerals, etc., upon the tramway lines have been carefully provided for, and no doubt this will in the future be found to be most valuable in serving the citizens. Owing to the contour of the district, all the railways and canals are placed in the southern half of the city, leaving considerable districts, chiefly residential, which are long distances from the railway and goods termini. A properly devised scheme (adds Mr. Hamilton), by utilising the powers of the tramway undertaking to convey minerals and goods over its routes, would undoubtedly lower the cost of conveyance of materials, and very much reduce the wear and tear of the public highways.

The committee requested the general manager to report fully on the prospects of utilising the tramways in this way.

FAILURE OF THE CROYDON STRIKE.

On May 15, Croydon Council, by 27 votes to 23, rejected a motion that on the strikers returning to work the Tramways Committee be requested to meet a deputation of four ex-employees and an outsider. The committee have had under consideration the conditions of service of the employees and the present fares and tramway services, and propose to report thereon when presenting the annual accounts. The weekly additions asked for by the union amounted to 15s. 7d. and 11s. 7d. for motormen and conductors respectively. One hundred and twenty-six men and ten women, who had been summoned for failing to deliver up their uniforms, have returned the clothing, and some of them have made application for reinstatement. They were taken on at the old rate of pay for the duration of the war. As many as fifty cars were in service on May 20. The committee, Mr. T. B. Goodyer, the general manager, and the staff deserve the thanks of the Corporation and the travelling public for the arduous work that they have performed in keeping the services going. Replying to a question in the House of Commons on May 24, the President of the Board of Trade said that the Chief Industrial Commissioner, who had been in communication with both parties before the strike, was still carrying on negotiations.

GLASGOW CORPORATION TRAMWAYS.

The financial year for all the Glasgow Corporation departments closed on Wednesday, May 31. The following are the traffic statistics for the tramways department for the year just closed :—

			Inc. or dec.
Average track mileage open during year (single) ...	196¼		
Car mileage	24,963,309	+	748,849
Traffic receipts	£1,149,264 7s. 6d.	+	£78,570 3s. 8d.
Traffic receipts per car-mile	11·049d.	+	·437d.
Traffic receipts per passenger	·761d.	—	·003d.
Passengers carried	362,371,464	+	26,110,706
Passengers carried per car-mile	14·516	+	·629

The following statement gives the number of passengers carried at each fare :—

	Year to May 31, 1916.		Year to May 31, 1915.
½d.	232,871,360	...	213,165,819
1d.	93,768,671	...	89,890,042
1½d....	22,712,943	...	21,384,305
2d.	6,913,560	...	6,410,027
2½d....	3,075,567	...	2,834,795
3d.	1,453,771	...	1,285,605
3½d....	1,382,636	...	1,136,895
4d.	192,956	...	153,270
	362,371,464	...	336,260,758

Since July 1, 1894, when the Corporation assumed the management, the totals are as follows :—Passengers carried, 4,417,319,065 ; miles run, 361,006,250 ; car traffic revenue, £16,060,483 12s. 4d.

Weight of copper received during the year to May 31, 1916, 735¾ tons, and the weight of silver 93½ tons.

Digitized by Google

G.E.C. CADET CORPS.

In most of the large and industrial undertakings there are employed considerable numbers of youths between the ages of 15 and 18 years. Many of them have been Boy Scouts, and if they are given the requisite encouragement they will take an active part in making themselves fit for military service when they reach the legal age for enlistment under the Military Service Act. It is, however, desirable that the encouragement take the form of practical support

Officers of the G.E.C. Cadet Corps.

from their employers, and undoubtedly much good work can be done to establish an active cadet corps among the youth of manufacturing undertakings and commercial houses.

A pioneer in this direction is Mr. H. Hirst, the chairman of the General Electric Company, who has instituted the G.E.C. Cadet Corps, and although it has only been formed barely two months, it has reached the established strength. The khaki uniform and equipment have been supplied to the corps by the company without charge. What might have proved an insuperable difficulty in the formation of the corps has thus been removed by the generosity of the directors. The corps is commanded by Captain E. A. Joyce, who has the assistance of Lieut. A. V. Cannon and Second Lieut. W. F. Arnold. The unit, which has received recognition under the War Department's cadet scheme, is attached to the First Cadet Battalion of the Sussex Yeomanry, and is 112 strong. The work has the fullest sympathy of Earl Kitchener, the Secretary of State for War, the Lord Mayor, and other public men.

The training is given in accordance with the "1914 Infantry Training Regulations," and the corps is already displaying marked ability. The cadets are put through a course of shooting once a week at the 10-target range at the Cripplegate Institute. Squad and company drill take place on Friday evenings at the Institute, and by permission of the Inner Temple Gardens Association, drill is engaged in on Saturday afternoons in the gardens on the Victoria Embankment.

The training will not only be of immense value as preparatory work when the cadets come to be called up to the army, but it also has a present day value in developing the physique of the lads. From the General Electric Company we learn that it also contributes considerably towards increased efficiency in business by making the lads take a greater interest in themselves, by accustoming them to discipline, by improving their manners, and by the establishment among them of *esprit de corps*.

The G.E.C. Cadet Corps.

SALFORD COUNCIL'S MOTOR CARS.

A special committee of Salford Corporation have issued a report giving the results of their inquiry as to the use made of the motor cars provided by the Council for municipal purposes, and their conclusions on the question of establishing a municipal garage. The committee submitted rules and regulations for the future use of cars belonging to the Corporation. The report furnished the following return of maintenance expenses of motor cars for one year :—

	Average per Mile. d.	£ s. d.	£ s. d.
Wages of chauffeurs	2·68		379 17 9
Material :—			
Petrol	·92	130 17 1	
Lubricating oil and grease	·10	14 11 11	
Tires and tubes	·70	98 1 0	
	1·72		243 10 0
Repairs	·60		84 12 2
Uniforms	·17		24 4 1
Licences and insurance	·37		52 16 8
Housing, including lighting and heating	·37		52 0 0
Water and cleaning materials	·03		4 0 0
Depreciation (20 per cent.)	2·02		286 19 6
	7·96		£1,128 0 2

Total car mileage for 1 year, 34,002 miles.

The annual cost of three horses and vehicles was given as £228, and a statement of the expenditure on horse and motor cab fares showed an outlay of £728 in 1913-14, and of £901 in 1914-15. The Council have adopted the committee's scheme.

Reporting on the subject of establishing a motor garage, the committee, after considering the information received from other municipalities, state that "the time is not opportune for the establishment of a municipal garage in Salford, as such a scheme would involve capital expenditure which, in their opinion, ought not to be incurred at the present time. Whilst this position may obtain your committee recommend that the Crossley landaulette, if not disposed of, and the Morris-Oxford car should be housed or stand at a place or places where the other departments may requisition them at any time when required on terms to be arranged and subject to the suggested rules and regulations for governing the use of the cars. Your committee suggest that for any excess need of cars, which this suggested provision would not meet, arrangements should be made with private owners under contract to supply cars as required."

In a reference to the use of horse vehicles by the Lighting and Cleansing and Parks departments, the committee state that it would be more economical and secure greater efficiency if those departments requisitioned a motor car as required.

Digitized by Google

FINANCIAL REPORTS AND MEETINGS.

Auckland Tramways Company.—The directors have declared a dividend of 7d., less tax, on the ordinary shares.

British Electric Traction Company.—A dividend of 3 per cent. on the new ordinary stock is announced for the year ended March 31.

City of Buenos Ayres Tramways Company.—A dividend of 1s. 3d. per share (being at the rate of 5 per cent. per annum), less income tax, has been paid for the three months to March 31.

Colombo Electric Tramways and Lighting.—On the past year's working a dividend of 10 per cent., free of tax, has been paid after placing £15,000 to general reserve and renewal fund, and carrying forward £8,165.

Improved Position at Colchester.—In consequence of the deficit on the tramways for the past year being only £402, the Tramways Committee have reported that it would probably be unnecessary to ask for aid from the rates.

Lowestoft Corporation Tramways.—The revenue for the year ended March 31 was £9,457, or £2,273 less, owing to the absence of visitors occasioned by the war. Working expenses at £7,052 were down by £882. The net result was a deficiency of £2,669.

Nelson Corporation Tramways.—The net profit for 1915-16 was £1,124 on an income of £10,151, as against £9,299 for 1914-15. Discount tickets have proved a popular feature, and the top-covered cars have been of such service that another is to be added during the present year.

Birmingham District Power and Traction Company.—The annual report gives the revenue for 1916 as £101,909, and the surplus, after providing £9,000 for renewals, £58,738. It is proposed to add to reserve £5,000, pay a dividend on the preferred ordinary shares of 4½ per cent., and carry forward £2,551.

Southport Tramways Company. The accounts for the year 1915 show a total revenue, including £150 brought forward, of £17,549. After deducting all expenses, appropriating £2,299 for repairs and maintenance, and £500 for renewals, the directors propose to transfer £1,000 to reserve, and carry £141 forward.

Accrington Corporation Tramways.—Traffic revenue for the year ended March 31 reached the sum of 12·86d. per car-mile, while the working expenses were 8·67d. The total receipts were £29,393, as against £27,850, the working expenses being £19,498 as compared with £16,438. Passengers numbered 4,841,334.

Merthyr Electric Traction and Lighting Company.—The revenue for 1915 was £24,685, and after providing for debenture interest, and £2,000 for renewals, the surplus was £5,484, while £723 was brought forward. A dividend of 7 per cent. is proposed on the ordinary shares, adding £1,000 to the reserve, and carrying forward £906.

Rochdale Corporation Tramways.—Despite a decrease in the car miles the gross receipts for the past year increased from £83,401 to £87,908. The net surplus is £3,608, against £4,284 the previous year, although the working expenses have been increased by £3,800 by payments to employees on active service and bonuses and extra income tax.

Nottingham Corporation Tramways.—As the result of the working of this undertaking for 1915-16, the receipts show an increase of £16,000 in advance of the previous year, while the expenditure was £11,000 up. For the relief of the rates £20,350, instead of £22,500, is taken, and £13,000 is set aside for the reserve fund, which stands at £37,000.

Brisbane Electric Tramways Investment Company.—The net profits for 1915, including £5,782 brought forward, were £95,667. There has been placed to a depreciation of investments fund £3,500, and a final dividend of 4s. per share, free of tax, on the ordinary shares is recommended, making for the year 8 per cent. £10,367 will be carried forward.

Tramways and General Works Company. The report for 1915 states that, including the balance brought forward, the amount now standing to the credit of the profit and loss account is £540, out of which the directors recommend the payment of a dividend at the rate of 4d. per share (less income tax), which will absorb £333, and leave £206 to carry forward.

West Hartlepool Corporation Tramways.—Alderman Martin, chairman of the Tramways Committee, has reported a profit of £1,278 on the tramways last year. This amount had been added to the reserve, which now stands at £5,706. The annual statement of the electricity undertaking shows a net increase in income of £1,295, and a credit balance of £316, against £44 in the preceding year.

Salford Corporation Tramways. Alderman Linsley, chairman of the Tramways Committee, has informed the committee that the past year's trading gave a net balance in hand of £18,000, whereas they had expected £22,000. The decrease was due to the payment of dependants' allowances, and the increased cost of labour and materials. In order to meet their promise to contribute £22,000 to the rates, the reserve fund would be drawn upon.

Peterborough Electric Traction Company.—For 1915 the revenue totalled £12,560, as compared with £10,967. After deducting all expenses chargeable to revenue, including repairs and maintenance and debenture interest, and setting aside £1,600 to renewals fund, there remains £1,484, which, added to £256 brought forward, makes an available balance of £1,740. This is to be applied in payment of one year's arrears of preference dividend, £1,320; leaving £421 to be carried forward.

Lisbon Electric Tramways Company.—After deducting interest and amortisation due on the debentures, London office expenses, and directors' remuneration, the trading for 1915 shows a net profit of £59,917, which, with £2,883 brought forward, makes £62,800. A final dividend of 2 per cent. is recommended, making 4½ per cent. net for the year, carrying £8,736 forward. In order to meet this year's contribution to depreciation reserve, £25,000 has been transferred to that account from the exchange reserve.

York Corporation Tramways.—For the past year the traffic receipts increased by £5,916. This was the first year of the motor omnibuses, and the combined mileage of the cars and omnibuses was 828,517, as against 766,360 the preceding year. The number of passengers was 8,204,719, as against 6,712,631, whilst the total receipts were £34,887, as against £28,971. The receipts per mile were 10·10d., as against 9·07d. During March the omnibuses carried 50,755, out of a total of 669,425 for the two means of traction, as compared with 592,458 in the corresponding month of 1915.

Johnson and Phillips, Limited.—Presiding at the meeting of this company, Mr. R. W. Blackwell alluded to the improvement in the accounts, which show a trading profit of £69,077. Owing to the conditions under which the company must be carried on for a considerable period to come, a larger dividend than 5 per cent., free of tax, on the ordinary shares, would not be justifiable, although the position of the company was financially sound and steadily improving. There was good reason, under existing conditions, to be satisfied with the future prospects.

Barnsley and District Electric Traction Company.—The revenue for the year amounted to £20,820. After providing for all expenses chargeable to revenue, including £1,675 for debenture and loan interest, and setting aside £2,500 to the renewals account, the surplus is £2,487, including £1,544 brought forward from the previous year. The directors recommend that this balance should be applied as follows:—Dividend for 1915 at the rate of 6 per cent. per annum on preference shares, £1,320; dividend at the rate of 5 per cent. per annum on ordinary share capital, £1,001; leaving £165 to be carried forward.

Satisfactory Year at Blackpool.—For the twelve months ended March 31 the tramway receipts were £80,070, which is the third highest total in the history of the undertaking. The gross profit was £35,036, and after deducting interest and sinking fund payment there was an available balance of £16,275. The record year was in 1913-14, when the net profit was £24,552, the next best year being 1912-13 with £17,664 net profit. As of late years the Tramways Committee have insisted on accumulating an adequate reserve fund, it is not expected that more than £8,000 will be devoted to the relief of the rates. That amount is equivalent to a 4d. rate.

Babcock and Wilcox, Limited.—The directors recommend that the following dividends be paid for the half-year ended December 31, 1915:—3 per cent. on the preference shares, 2½ on the second preference shares, less tax, and 9 per cent. on the ordinary shares, tax free. The sum of £150,000 has been placed to reserve, and £10,000 has been granted to the staff pension fund, leaving £42,125 to be carried forward. Mr. J. Dewrance presided at the annual meeting on May 9. He stated they had £466,000 for appropriation, compared with £476,000 last year. The company were now a controlled establishment, and instead of making boilers and cranes, they were doing work required by the Ministry of Munitions.

Kidderminster and District Electric Lighting and Traction Company.—The net receipts of the lighting undertaking for 1915 were £4,561, and with £3,471 for dividends on investments, and £219 brought forward, the total was £8,251. After deducting expenses, interest on temporary loans and debenture stock, and providing £500 for renewals, there remained £3,708, of which there will be appropriated to reserve £750, to dividend on cumulative preference shares for the past year (already paid) £1,500, and carried forward £1,458. The profit on the tramways, after providing for renewals, was £2,439, which, added to £163 brought forward, left £2,602. This has been dealt with as follows:—To reserve £500, dividend at rate of 3½ per cent. £2,002, carried forward £100.

Cork Electric Tramways and Lighting Company.—Mr. E. Anderson, presiding at the nineteenth ordinary general meeting, stated that the gross receipts had increased by £2,301, or £1,920 in excess of the previous year. The lighting and power receipts were £1,920 in excess. The revenue totalled £63,905. The expenses were £42,415, an increase of £4,457, due to the high price of coal and war allowances to the staff, involving charges amounting to £5,800, equivalent to 5 per cent. on the ordinary capital. After transferring £6,500 to the depreciation and renewals fund, writing off £1,804 for wiring consumers' premises and the depreciation of investments, and paying the preference dividend, there was a balance of £1,560. This was

Digitized by Google

to be carried forward, together with £2,480 from the previous year. Mr. H. C. Levis and Captain W. Martindale were re-elected directors.

Bournemouth Corporation Tramways.—The traffic receipts for 1915-16 amounted to £107,818, an increase of £5,472. The car-miles run amounted to 1,670,702, a decrease of 144,930. The receipts work out at 15·49d. per car-mile, as against 13·52d., being an increase of 1·97d. The working expenses totalled £51,796, being at the rate of 7·44d. per car-mile, as against 7·27d. for the previous year. The gross expenses amount to £89,181, as against £90,678, the net balance being £19,337. From this figure must be deducted the allowance made to employees who joined the forces, namely, £4,173, as against £2,352, and the capital charge and deficit on the running of the motor omnibuses, namely, £1,032, as against £1,188 last year, leaving a net profit of £14,132, as against £9,083. The Council at their May meeting adopted the recommendation of Mr. I. Bulfin, the general manager, that £10,000 be placed to renewals and £1,000 to reserve. The renewals fund stands at £13,000 and the reserve fund at £5,000. Just over £700 has been expended on renewals to cars, overhead equipment, and power plant, and £2,000 on the permanent way. During the past five years the total profits amounted to over £50,000, or an average of over £10,000 per annum. This amount has enabled reconstruction work on several routes to be carried out, resulting in very greatly increased revenue. The permanent way of the main section is satisfactory, but as soon as normal prices prevail it will be necessary to reconstruct it.

Bath Electric Tramways Company.—After providing for the preference dividend, the 4½ per cent. debentures, and the sinking fund, the company's operations for the past year show an available balance of £8,486. At the annual meeting the directors recommended that that sum should be added to the reserve for depreciation and renewals. The loan from the bank had been brought down to £16,000. Originally it was £28,000. Sir J. Sivewright, who presided, said the receipts showed a decrease of £5,558, which was largely attributable to the reduction of the road motors in the latter part of 1914, when a large number were transferred to the military service. Economies in operation and expenses more than offset the diminution in receipts, so that they had a greater net revenue. The plant, rolling stock, and permanent way were all in an efficient condition. Two hundred and twenty-one employees had either joined the forces or attested. The gross balance was £20,085, and the net balance £8,486. The reduction of the loan had improved the value of the shares. There was a promising future before the company, and if they pursued their present policy they would have an improved motor fleet and their foundry would be extended. They had a splendid business. Colonel H. F. Clutterbuck was re-elected a director.

London County Council Tramway Accounts.—The report of the District Auditor on the accounts of the London County Council for the year 1914-15 gives the following comparative statement of tramways income and expenditure:—

	Year ended March 31, 1914.		Year ended March 31, 1915.	
	Income.	Expenditure.	Income.	Expenditure.
	£	£	£	£
Electric traction	2,247,043	1,585,251	2,389,046	1,684,244
Horse traction ...	21,626	30,215	10,801	16,328
	£2,268,669	£1,615,466	£2,399,847	£1,700,572

For the year ended March 31, 1915, the expenditure included a charge of £42,209, covering allowances made to officers and employees in the tramways department who were serving with the forces. The surplus on revenue (working) account for 1914-15 amounted to £699,276. The net revenue account showed a deficiency of £33,173, which has been met out of the general reserve fund. In regard to this fund the auditor remarks that the Council on June 23, 1908, agreed that provision should be made for renewals at the rate of two-thirds of a penny per car-mile run, this basis to be reconsidered at the end of five years. It was also agreed that the balance remaining on the net revenue account, after providing for renewals on the basis referred to, should be carried to the general reserve fund for providing for general contingencies. Owing to the changed financial position of the undertaking, reconsideration of the subject has been postponed to April 15, 1917. Full provision was made on the original basis up to the year ended March 31, 1912. In the following year the sum required to be provided was £150,309, but the sum available was only £497. There were deficiencies on the net revenue accounts for the years ended respectively March 31, 1914 and 1915, and no provision for renewals has been made during those two years. The balance of the renewals fund on March 31, 1915, was £402,045. The general reserve fund on March 31, 1915, amounted to £163,050. The aggregate capital expenditure to March 31, 1915, amounted to £13,315,723, made up as follows:—

In respect of electric traction	£11,189,215
In respect of horse traction	142,399
In respect of obsolete lines	1,984,109

The net debt at March 31, 1915, amounted to £9,836,187.

CONTRACTS AND ORDERS.

Southend Council have ordered six miles of trolley cable from the British Insulated and Helsby Cables, Limited.

Leyton Tramways Committee have placed an order with Messrs. Edgar Allen and Company, Limited, of Sheffield, for a lay-out.

The British Westinghouse Company have received a contract for the supply of traction glow lamps to the London County Council.

W. T. Henley's Telegraph Works Company's tender for the supply of cables for the ensuing year has been accepted by Walthamstow Council.

Nelson Tramways Committee have decided to have five additional trucks fitted with new car bodies by the United Electric Car Company, of Preston.

P. R. Jackson and Company have received an order from Walthamstow for twenty-four commutators for the tramways department, the price being £5 5s. each.

Wolverhampton Council have accepted the tender of Messrs. Strachan and Henshaw, of Bristol, for the installation of ash-handling plant at the electricity works.

Mr. G. P. Wilson has received a contract from Southampton Tramways Committee for brake blocks and castings, at £5 12s. 6d. per ton, an increase of 8s. per ton as compared with last year.

Salford Electricity Committee have awarded a contract to the British Westinghouse Company for the supply of transformers, and to the Underfeed Stoker Company for two mechanical boilers.

Southend Light Railways Committee have placed orders with Mr. D. B. Rose for ears, and with Messrs. R. W. Blackwell for strainers, wire bolts, and mechanical frogs for new overhead equipment on the Leigh route.

East Ham Council have allotted a contract for top dressing granite setts for the tramways to Mr. G. Battersby, at 1s. 3d. per yard super, and to W. Stone and Son, for engineers' sundries for the tramways and electricity departments.

Coal Contracts.—East Ham Council have accepted tenders for 11,000 tons of coal for the electricity works for twelve months at prices ranging from £1 2s. 5d. to £1 8s. 11d. For slack the charges are from 16s. 5d. to 19s. 5d. per ton.

Keighley Council have placed contracts as subjoined:—Dorman, Long and Company, steel girders and other steelwork for foundations of new 5,000 KW. turbo-alternator, £132; H. V. Robinson, Limited, construction of foundations for turbo-alternator, £1,217.

Victorian Railways Department have accepted the tender of Noyes Bros. for Ackley hand brakes at £8 5s. each for new bogie cars for the St. Kilda-Brighton electric railway, and of the Australian General Electric Company for material for railway car lighting.

Manchester Tramways Committee have placed the following contracts:—Bell Punch and Printing Company, Limited, tramcar passenger tickets; Drake and Gorham, Limited, half-watt lamps and drawn-wire filament traction lamps; General Electric Company, Limited, carbon-filament lamps, half-watt lamps, and drawn-wire filament lamps.

Glasgow Tramways Committee have accepted the following tenders:—Points and crossings and special junction work, Hadfields, Limited; chilled-iron brake blocks (three months), Miller and Company, Limited; steel axles (six months), Glasgow Railway Engineering Company, Limited; steel tires (six months), Brown-Bayley's Steelworks, Limited.

Accrington Council have allotted contracts as appended:—British Thomson-Houston Company, 2,000 KW. turbo-alternator, water-condenser, etc.; Lancashire Water Cooler Company, water-cooling tower; E. Bennis and Company, modernising one set of mechanical stokers; J. P. Hall and Sons, boiler-feed pumps; Messrs. Holden and Brook, feed water heater.

London Track and Car Work.—The Highways Committee have reported to London County Council that the value of the special track work obtained during 1915 from Hadfields, Limited, under their contracts was £6,904 17s. 11d. for tramway construction and reconstruction work, and £29,100 14s. 6d. for renewals and maintenance purposes. Tenders were recently received for the supply of driving wheel and pony wheel steel tires, but the committee decided not to accept any of them. The purchase of tramway materials, etc., and the execution of small works and repairs, at an estimated cost of £38,648, has been sanctioned. The committee have authorised the continuance of the employment until October 31, 1916, of a temporary inspector in the chief engineer's department, engaged in supervising the manufacture of rails, at a rate of pay not exceeding £5 5s. a week.

Greenwich Generating Station.—The Highways Committee of London County Council have arranged for blades of a heavier section, laced together, to be substituted for the high pressure blades in the first and second expansions of turbines Nos. 5 and 6 at Greenwich generating station. The new blades are being manufactured by Messrs. Willans and Robinson, the makers of the machines. A pair of grates to be fitted with a new type of stoker link are to be

Digitized by Google

obtained, the links being supplied by E. Bennis and Company, Limited. Two machines for breaking up coal are being supplied by W. J. Jenkins and Company, Limited. Tenders for the foundations for the turbo-generators have been obtained, and it is estimated that the expenditure will amount to about £5,250. During the quarter ended March 31, 1916, 36,180 tons of coal for use at the generating station were purchased at a cost of about £48,038.

Shanghai Municipal Council have recommended for acceptance the following tenders:—Scholey and Company, Taylor underfeed stokers, induced and forced draught fans, and chimney for two boilers, £5,370; C. A. Parsons and Company, 10,000 KW. turbo alternator, £32,605; General Electric Company of New York, 10,000 KW. turbo-alternator, £31,720; Fraser and Chalmers, 5,000 KW. turbo-alternator, £16,009; Babcock and Wilcox, eight marine type water-tube boilers, £65,217; Fraser and Chalmers, coal handling plant, £9,867; British Thomson-Houston Company, e.h.t. switchgear for Riverside Works (22,000 volts), £7,575; h.t. switchgear for Fearon Road Station (6,600 volts), £1,565; e.h.t. switchgear for Fearon Road Station (22,000 volts), estimated cost £3,000; Mather and Platt, circulating water pumps for condensers, £3,697; Westinghouse Manufacturing Company, static transformers, £12,300; British Insulated and Helsby Cables, 40,000 yards split conductor e.h.t. underground cables; United States Steel Products Company, steel work for buildings, £8,026.

London County Council Tramways Equipment, 1916-17.—The following tenders for tramway equipment, etc., during 1916-17 have been accepted by the Highways Committee:—

Electrical Equipment (Motor and Generator) Spares.—Alfred Clare and Company, British Westinghouse Electric and Manufacturing Company, Limited.

Electrical Equipment (Controller, Circuit Breaker, and Other Switch, etc., Details and Magnetic Brake) Spares.—British Westinghouse Electric and Manufacturing Company Limited.

Contact Fingers and Parts, Segments, etc.—British Westinghouse Electric and Manufacturing Company, Limited; Dyer and Young; E. Showell and Sons, Limited; Tramways Supplies, Limited.

Electric Cable, Fuse Wire, and Cotton Covered Copper Wire.—Liverpool Electric Cable Company, Limited; Callender's Cable and Construction Company, Limited; British Insulated and Helsby Cables, Limited; London Electric Wire Company; and Smith's, Limited.

Coachpainters' Transfers.—J. H. Butcher and Company; Tearne and Sons.

Copper Bonds.—Watlington and Company, Limited.

Rubber Details.—J. G. Ingram and Son; Irwell and Eastern Rubber Company, Limited.

Moulded Insulators (Other than Rubber).—British Westinghouse Electric and Manufacturing Company, Limited; Crystalate Manufacturing Company, Limited; Ebonestos Manufacturing Company, Limited; Litholite, Limited.

Fibre Articles.—Micanite and Insulators Company, Limited; L. Andrew and Company.

Track Insulators and Porcelains for Electric Track Work.—Bullers, Limited; Taylor, Tunnicliffe and Company, Limited.

Car Furniture.—J. M. Siddell; Player and Mitchell; E. Showell and Sons, Limited.

Machined Bronze Bearings.—Anti-Attrition Metal Company, Limited.

Machine Finished Articles (Brass, Gun-metal, etc.).—E. Showell and Sons, Limited; Player and Mitchell; Anti-Attrition Metal Company, Limited.

Machine Finished Articles (Wrought-iron and Mild Steel).—W. J. Ritchie and Company; British Westinghouse Electric and Manufacturing Company, Limited; J. Holroyd and Company, Limited.

Gear and Pinion Wheels, Ratchets, Worms, etc.—F. W. Rowlands and Company.

Iron and Steel Forgings.—Male and Jordan; W. J. Ritchie and Company; Warren and Sons; Hurst, Nelson and Company, Limited.

Springs.—Crown Spring Company; West Bromwich Spring Company, Limited.

Machined Iron Castings.—J. Holroyd and Company, Limited; J. Crowley and Company, Limited; Peter Hooker, Limited; Carron Company.

Iron Castings.—Sheepbridge Coal and Iron Company, Limited; J. Williamson and Company.

Brake Shoes.—Pease and Partners, Limited.

Machined Malleable Iron Castings.—Bullers, Limited; Leys' Malleable Castings Company, Limited; J. Crowley and Company, Limited.

Malleable Iron Castings.—J. Crowley and Company, Limited.

Steel Castings (Machined and Unmachined).—Edgar Allen and Company, Limited; Hadfields, Limited; S. Peace and Sons, Limited.

Foundry Crucibles, etc.—Morgan Crucible Company, Limited.

PERSONAL.

Sir Hiram Maxim has accepted the invitation of the Aeronautical Institute to become their first president.

Sir C. A. Parsons is a member of the committee appointed to inquire into the administration and command of the Air Service.

Mr. A. J. Abraham, general manager of the Aberdare electricity and tramways department, has been granted an increase of salary of £50 per annum.

Mr. Edgar Allen, steel manufacturer, left £32,000 to Sheffield University for the provision of scholarships, half of them to go to the sons of working men.

Mr. H. A. Kell, assistant electrical engineer to Luton Corporation, on the recommendation of the Electricity Committee, has been granted an increase in salary.

Mr. F. P. Dolamore, who acted as deputy to the late Mr. F. W. Lacey for many years, has been appointed borough engineer and surveyor of Bournemouth pro tem.

Mr. A. O. Kolkhurst, general manager, Lisbon Tramways Company, and the entire staff, received the appreciation of the directors in the annual report for their services during the past year.

Mr. C. F. Butler, late acting manager and engineer, Gravesend and Northfleet Tramways Company, has received a War Office appointment as station engineer to a group of generating stations near Salisbury.

Mr. A. L. C. Fell, chief officer of the London County Council Tramways, is, we are glad to state, making satisfactory progress after his serious illness. It is hoped that he will shortly be able to resume duty.

Mr. H. P. Gibbs, consulting electrical engineer to the Government of Mysore, and general manager of the Tata hydro-electric installation in Bombay, has been granted leave of absence to return to the United States.

Mr. G. F. Craven, general manager and electrical engineer, Reading Corporation Tramways, has been recommended for an increase of £50 a year in his salary of £550, to date from April 1 last, instead of January 1 next.

Alderman G. Brodie, for many years chairman of Blackpool Tramways and Electricity Committee, has undergone a long illness. Upon reappearing at the Council meeting in May he was warmly congratulated on his recovery.

Mr. G. Morris and Mr. E. J. Riley, car shed superintendent and chief clerk respectively, Leicester Corporation Tramways, have been awarded increases of salary, the former from £260 to £285, and the latter from £200 to £215.

Mr. W. M. Murphy, chairman of Dublin United Tramways Company, presided at a meeting of property owners and traders held at the Mansion House in that city, at which the Government were asked to lose no time in making good the losses that were sustained during the rebellion.

Alderman J. H. Hargreaves, Lord Mayor of Hull, having accepted the chairmanship of the Parliamentary Committee of the City Council, under a new bye-law of the Corporation, has had to retire from the chair of the Tramways Committee, which he has filled for three years. Councillor W. Wheatley was unanimously elected chairman of the Tramways Committee on May 24, and Councillor Hakes was appointed deputy-chairman.

Mr. W. E. Hardy, general manager and engineer, Bath Electric Tramways Company, and his staff were paid a compliment by Sir J. Sivewright, the chairman, at the annual meeting. Sir James remarked that it was satisfactory to know that the company and their staff had the confidence of the people of Bath. The company were excellently served by their officials and staff, who, without exception, put their heart and soul into the work.

Mr. J. H. Cowell, general manager, Blackburn Corporation Tramways, was warmly commended by Councillor C. Higham, vice-chairman of the Tramways Committee, in referring, at the Council's May meeting, to the working of the undertaking during the past year. Nowhere in the country, said the vice-chairman, were the cars and their upkeep better looked after, and the time was not far distant when the undertaking would stand free from debt.

Potteries Electric Traction Staff.—In the course of his remarks at the annual meeting of the Potteries Electric Traction Company, the chairman said he must refer to the excellent work which had been done under very trying circumstances by the general manager, Mr. W. Thom; the assistant manager, Mr. F. Hatch; Mr. Edwards, and the other officers. Mr. Thom had had thrown on his shoulders the work of arranging for the release of as many men as possible, and the work he had done had been fully recognised by the local recruiting authorities. On behalf of the shareholders he expressed their thanks to the officers for their good work. A reference to the distinctions gained on active service by Major Chapple, the power and rolling stock superintendent, appears under the heading, "With the Forces."

Sir Robert Hadfield, as chairman of the Standing Committee on Metallurgy, appointed by the Advisory Council for Scientific Research, at the opening meeting, called attention to the need in research and to the particular necessity for improvement and progress in metallurgy of iron and steel. Great Britain had been far from backward in this field, but there was room for a great extension of research, in which there would be a happy combination of science and practice. Further progress of metallurgy depended largely on securing the supplies of the special alloys and materials required, and there was now need for a central clearing-house, in order that as soon as new knowledge was secured as to valuable products in any part of the Empire it should be made available for British industry. No foreign control should be permitted.

Mr. I. Bulfin, general manager, Bournemouth Corporation Tramways, and his staff were complimented at the May meeting of the Council upon the results of the last year's working. Upon the recommendation of the Tramways Committee, Councillor Bell, chairman, moved "That the Council express to the general manager their appreciation of the position of affairs as shown by the report, which the committee consider, having regard to the exceptional circumstances of the year under review, is a matter for congratulation of both the manager and the entire staff." On the motion of the Mayor it was decided that the minute should be embodied in a letter to Mr. Bulfin. His Worship added that a good manager, a good chairman, and a loyal committee all deserved their meed of praise. In the report Mr. Bulfin referred to the loyalty of the staff in doing extra work.

Alderman F. Arnold, who died at Great Yarmouth on May 12, was for several years chairman of the Tramways Committee. Mr. Arnold was the foremost advocate of the introduction of the tramways to the town, and he displayed great interest in the work of the committee and the welfare of the employees.

Digitized by Google

WITH THE FORCES.

Mr. E. J. Smith, the agent of the London and South Western Railway in Paris, has been granted a commission in the Royal Flying Corps.

Mr. L. C. F. Bellamy, manager and electrical engineer, Ilkeston Corporation Tramways, is still on active service at the front as a lieutenant in the Royal Engineers.

Mr. E. Bignell has resumed duty as installation superintendent at Sutton with the South Metropolitan Tramways and Lighting Company on being invalided from the army.

Mr. G. G. Hazard, London representative of Siemens Brothers' Dynamo Works, Limited, Upper Thames Street, E.C., has been appointed to the motor transport of the Army Service Corps.

Lieutenant Mulliner, assistant borough electrical engineer, Eccles, has been invalided from France owing to nervous breakdown. After a sojourn in hospital at Hampstead, he has gone to his home at Malvern.

Mr. C. W. Salt, borough electrical engineer of Torquay, who enlisted in the London electrical unit of the Royal Engineers and was recently given a commission therein, has been congratulated on his promotion by the Torquay Corporation.

Lieutenant Ben Fry, who for about three years prior to the war was purchasing agent for the Buenos Aires Lacroze Tramways and the Buenos Aires Central Railway, has been for the past sixteen months serving in the Army Ordnance Department. He was first posted to Tidworth, and then obtained a transfer to Devonport, where he remained until February last, when he received instructions to proceed to Liverpool. Lieut. Fry's new appointment is affording him an excellent opportunity of seeing the practical working of the railway at the port.

Major N. C. Pilcher, Canadian Mounted Rifles, brother of Mr. R. S. Pilcher, manager of Aberdeen Corporation Tramways, was killed in action on May 26. Major Pilcher came over with the Canadian Expeditionary Force nearly a year ago. He was through the whole of the South African campaign, and had been connected with the Canadian Militia for many years. In civil life he was general manager of the Sherbrook Electric and Street Railway Company, Sherbrook, Province of Quebec, Canada. He leaves a wife and one child.

Major F. J. Chapple, power and rolling stock superintendent, Potteries Electric Traction Company, who is serving at the front with the North Midland Heavy Battery, was referred to by Mr. R. J. Howley, the chairman of the company, at the annual meeting. The shareholders, he said, would be glad to hear that Major Chapple, as he now is, had been mentioned in despatches and had been made a Companion of the Distinguished Service Order for the good work which he had done since February last. He was sure that the thoughts of the shareholders went out to Major Chapple and to the other members of the staff who were serving their country, and that they wished them all good luck and a safe return.

Captain R. J. Smith, of the Lancashire Fusiliers, who was killed on May 5, after graduating at Dublin University, went to Manchester to take up a position in the electrical department of the British Westinghouse Company in Trafford Park.

RAILWAY OFFICERS AND STAFF.

Mr. A. L. Charles, J.P., has retired from the secretaryship of the Midland Railway Company.

Mr. A. Scholefield, of Lint Close, Alnmouth, Northumberland, has been elected a director of the North Eastern Railway Company in place of the late Viscount Ridley.

Mr. Ralph Cope, chief clerk, has been appointed principal assistant to the chief accountant of the Great Western Railway. He entered the company's employ as a clerk in 1877.

Sir Charles Bine Renshaw, chairman of the Caledonian Railway, has been appointed by the Treasury chairman of the Committee for the Organisation of War Savings in Scotland.

Mr. E. Wells has resigned the position of chief joint accountant of the Great Western Railway, to which he was appointed in 1913. In 1902 and 1913 he visited Brazil as a member of a city firm of accountants, and reorganised the accounts of several railways.

Mr. A. W. Lyon, senior partner of the firm of Price, Waterhouse and Company, has been appointed by the Board of Trade to succeed to the position of consulting accountant to the Government, in connection with the control of the railways, rendered vacant by the death of Mr. J. Gurney Fowler.

Sir Charles Rivers Wilson, Finance Minister in Egypt 1878-79, British representative on the Suez Canal Board 1876-95, former president of the Grand Trunk Railway, and chairman of the British Electric Traction Company, who died on February 9 last, aged 84, left unsettled estate £10,091 gross and £8,528 net.

Mr. W. W. H. Warneford, on relinquishing the post of manager of the Crewe works of the London and North Western Railway, has been presented with an illuminated address and a case of cutlery from 4,866 employees and munition girls. To Mrs. Warneford a diamond ring was given. Mr. Warneford, who has been appointed superintendent at Earlestown, entered the works thirty-three years ago, and he was only 22 years of age when he became assistant manager of the steel works.

Sir Gilbert Claughton, chairman of the London and North Western Railway, voiced a stirring welcome at a luncheon at the Euston Station Hotel on May 16 to the employees of the company who formed the crew of the company's steamer "Tara," which was torpedoed in the Mediterranean. The survivors were landed on the North African coast, and fell into the hands of the Senussi. They were rescued by a motor car column commanded by the Duke of Westminster. The "Tara" was in the employ of the Admiralty.

Mr. J. J. Hill, the railway magnate, died at St. Paul, Minnesota, on May 29, after an operation. He had amassed a great fortune by railway construction and operation, and in face of the competition of the Northern Pacific and the Canadian Pacific, he succeeded in extending the St. Paul, Minneapolis and Manitoba Railway across three thousand miles until it became the Great Northern. His latest scheme was to rebuild the railways of Belgium.

CONDITIONAL EXEMPTION OF EMPLOYEES.

Mr. E. Hatton, general manager, Newcastle Corporation Tramways, appeared before the Newcastle Military Tribunal on May 9, with regard to tramway employees. He said they had a number of married conductors who were being trained as motormen. Out of 823 employees, 133 were eligible for service. There were 30 single motormen whom he must keep, and there were 100 married men who had received conditional exemption. The conductors were being trained as motormen, and in all there were 107 of such men for whom he wanted exemption. Lads were driving and earning 40s. per week, with overtime. In reply to the chairman, Mr. Hatton said that if the Government would release soldiers who were no longer needed, he would be glad to release some Corporation employees. But the Government would not listen to it. There was an increasing difficulty in getting women. The chairman suggested that an application be made to the Ministry of Munitions to secure released men so that further tramway employees might be released. It was agreed that the motormen be given conditional exemption, and a similar course was adopted with respect to 32 single conductors who were being trained as motormen and 75 married conductors. It was also decided that all up to and including group seven (men under 25 years) should be refused exemption. With regard to the inspectors, it was decided that all up to and including group 40 be refused exemption, and all labourers at the power station were similarly treated.

The Middlesbrough, Stockton, and Thornaby Tramways Company made application to Stockton Military Tribunal for the exemption of 16 drivers. The company had released 115 men and made provision for their dependants. They were now down to the limit of their staff, and for every three men taken away it would mean the withdrawing of one car from the service. In answer to the chairman, the manager said he had not introduced girls because he had been able to obtain plenty of youths under military age as conductors. It would not ease the situation to discharge these lads and take on their sisters. The tribunal thought the company should be able to make arrangements to spare a few more men, and seven of the applications were dismissed and nine granted conditional exemption.

At Wallasey, Colonel R. R. Greene, the tramways manager, asked for the exemption of twenty-six motormen. The military representative asked for some of the men, even if it involved inconvenience. Colonel Greene replied that they were ten men short for the present inadequate service. If more men were taken the service would have to be reduced. The traffic was greater than last year. If he found it possible to spare another man he would do so. Exemption was granted so long as the men remained in their present occupations.

Chicago Transit Problem. Messrs. W. B. Parsons, R. Ridgeway, and B. J. Arnold have been appointed traction commissioners to investigate Chicago's transportation problem, with a view to determine on a plan for consolidated operation of elevated, surface, and, possibly, subway systems. Mr. H. M. Brinckerhoff has been appointed chief engineer to the Commission. During the past ten years he has reported upon many of the operating conditions of the largest companies in the States, and has visited and studied the traction undertakings of Europe.

Digitized by Google

TRAMWAY AND LIGHT RAILWAY NOTES.

BIRMINGHAM.

TRAILER CAR EXPERIMENTS.

Besides taking advantage of the information available on the running of trailer cars in London, the Birmingham tramways department are making a thorough test from three points of view in the trailer car experiment in that city. It is being undertaken to show whether trailers are feasible having regard to the peculiar conditions of the city, what the effect will be on the general traffic in the thoroughfares, and whether the innovation is advisable from the point of economy. The experiment was entered upon owing to the shortage of cars and labour. In order to meet the requirements of the Board of Trade, the motor car and trailer have been fitted with a special coupling and brakes. At a trial inspection on May 15, a single-deck trailer was coupled to a double-deck car, and was run over two or three routes under the direction of Mr. Alfred Baker, the general manager.

BLACKBURN.

MAINTENANCE DURING SHORTAGE OF MATERIALS.

Mr. J. H. Cowell, general manager Blackburn Corporation Tramways, states that general repairs and maintenance were well attended to during the past year, and the cars were in a high state of efficiency. Four miles of trolley wire had been renewed, another portion should be renewed during next year, but as the wire could not be purchased at the present time, he had had this portion anchored so that there would be less danger of accident in case of breakage. By this means the Committee would be able to defer renewal to another year. Owing to the difficulty of obtaining rails, he had had renewed the really dangerous sections of the permanent way, so that the portions held over for renewing occur on the straight and not on inclines or curves.

BRADFORD.

FREE RIDING IN 1915–16.—ECONOMY IN RUNNING.

During the year ended March 31, 443,230 free tickets were issued to soldiers, Belgians, and visitors attached to the Lord Mayor's Relief Fund. The aggregate value of these tickets, estimated at 1½d. each, amounted to £2,770. The tickets were issued to the various classes of free riders in the following proportions: Soldiers, 333,400, of the value (on the basis of 1½d. per ticket) of £2,084; Belgians, 97,180, of the value of £607; Lord Mayor's Relief Fund visitors, 12,650, of the value of £79. In order to induce passengers to assist in the economical running of the cars they have been asked by the *Observer* of that city to give timely notice to the conductor when they wish to enter or alight. The writer states that the cost of electricity required to run a car for an hour is about 1s. 2d. or 1s. 3d., and the total cost of electricity for the tramways is about £50,000 a year. Some years ago there was a difference between the cost of running involved by particular drivers and others of from 33 to 40 per cent. As the result of care bestowed on their training most of the drivers are now within 5 per cent. of each other.

DUBLIN.

RESUMPTION OF TRAMWAYS TRAFFIC.

The military authorities allowed the full tramway service to be resumed in Dublin on May 15. The last cars started 15 minutes earlier than was the case before the revolt. Some of the services were restarted during the preceding week, but when passing the military cordons the cars were stopped for a cursory inspection of the passengers. Mr. D. M'Dowall Grosart, secretary and manager Dublin and Lucan Electric Railway, has related that when the rebels took possession of the South Dublin Workhouse on Easter Tuesday, sniping was continuous. The roar of machine guns and rifles became continuous, and the bullets passed over the company's buildings in hundreds. Soldiers were accommodated on the premises of the company, who supplied them with food. The company's service was maintained throughout.

DUNDEE.

WHY THE CITY HAS NO WOMEN CONDUCTORS.—RESTRICTION OF FREE RIDING.

According to Mr. Peter Fisher, the general manager of the tramways department, women have been brought to Dundee from four other towns to be trained to work at local factories; thus it would appear that there is a shortage at Dundee. On the other hand, there is a plentiful supply of discharged soldiers, and these men are being employed as conductors. Mr. Fisher pleads for a more sympathetic attitude from the public towards these men, who are often put upon the cars after three days' training. The Tramways Committee have restricted free passes to totally blind persons, nurses on war work, ordinary nurses, and probation officers.

GLASGOW.

84 WOMEN DRIVERS, 500 CLEANERS, 1,200 CONDUCTORS, AND MANY SWITCHBOARD ATTENDANTS.—TRAFFIC INTERRUPTION BY PROCESSIONS.—EXCURSION CARS.

On May 11, the date of the publication in *The Tramway and Railway World* of the photograph of a group of women tramcar drivers, their numbers totalled 68. Two weeks later they numbered 84, and Mr. James Dalrymple, the general manager, states that they all acquired experience as conductors before being taught to drive a car. On May 20 there were 200 women engaged in car cleaning and 300 men. By the end of the month all the latter had been liberated for national service. There are now more than 1,200 women conductors, as against 400 men. Some weeks ago women were trained to take charge of the switchboards in the power stations, after undergoing a test of their educational attainments. In consequence of their success in that capacity, some of them have been placed in charge of sub-stations. Owing to the inconvenience to the public and interruption of traffic generally consequent upon the tramway traffic being held up by processions through the streets, the Tramways Committee have made representations to the Magistrates Committee to the effect that when sanctioning these processions the magistrates define the routes. Councillor Montgomery, chairman of the Tramways Committee, has announced that the department cannot grant special car facilities on Saturdays. The department are not building any new cars, the traffic is the largest on record, and in these circumstances all available cars are required for the ordinary traffic. Pleasure parties, however, can have the use of special cars on other days.

HULL.

EMPLOYEES' FIXED HOURS OF WORK.

Alderman Hargreaves, Lord Mayor of Hull, in retiring from the chair of the Tramways Committee on May 24, reviewed the work of the committee during his three years' chairmanship. The employees' hours of labour had been adjusted, he said, by a system that did not exist in any other city. The men began duty at a certain time and knew exactly the hour at which their day's work was ended. Volunteers had always been ready to come forward for overtime work. During the three years the cost of car maintenance had been reduced by £12,000. Halfpenny stages had produced gratifying results, the income having increased from 8½d. per car-mile to 9½d. At the end of the last financial year the department had a profit of £12,469, of which £10,000 went in relief of the rates, and £2,469 passed to the reserve fund, which now stood at £142,000. The committee were paying £4,078 annually in war bonus, and £8,759 per annum to men who had joined the forces. There was an increase in the coal bill of £1,997, and soldiers were carried for nothing. The population had been reduced in two years by enlistment from 291,118 to 269,530.

LONDON.

TRAILERS FOR THE M.E.T.—FOURTH TRAILER ROUTE ON THE L.C.C. TRAMWAYS.—PRAISE FOR TRAMWAYS MANAGEMENT.—THE CLOSING OF RAILWAY STATIONS.

The application made by the Metropolitan Electric Tramways Company, Limited, for authority to run trailer cars has been sanctioned by the Board of Trade. The London County Council have adapted a depot at Evelyn Street, Deptford, for the housing of trailer cars, which are being run on the Greenwich and Woolwich section. This is the fourth route on which trailers are in service, greatly to the convenience of the travelling public, while other forms of traffic are in no way hindered. The National Association for the Extension of Workmen's Trains and Tramcars has written thanking the Council and the tramways management for their successful efforts to increase the early morning tramway services in order to carry the traffic displaced on the South Eastern and Chatham Railway by the closing of several stations in South London. Workpeople, the Association stated, much appreciated the additional accommodation provided on the tramways. In reference to the approaching closing of certain G.E.R. stations, the Highways Committee have reported that so far as the traffic was directed to Aldgate there would be no difficulty in accommodating the passengers, although the tramways were unable to offer to passengers to Liverpool Street a convenient and direct service equivalent to that afforded by the railway. It is estimated that 2,000 railway passengers will be displaced.

MANCHESTER.

REQUESTS FOR THROUGH RUNNING.—SAVING OF TIME BY RAILWAY ELECTRIFICATION.—A TRIBUTE TO WOMEN CONDUCTORS.

In order to meet the requirements of factory workers in the Reddish district, arrangements have been made with the Stockport Corporation Tramways for the temporary through running by Manchester Corporation cars. In response to an appeal made at a meeting of Oldham Town Council, Oldham Tramways Committee undertook to reconsider the question of through running to Manchester and to Rochdale. On the latter route it was stated that the double-deck cars could not pass underneath a railway bridge, and a member advocated that the height of the vehicles should be reduced. In connection with the opening of the electric train service between Manchester and Bury, a statement has been issued showing that by steam train the journey from Manchester to Bury, with stops, takes 32 minutes, as compared with 24 minutes on the electric service. From Bury to Manchester the time by steam train is 29 minutes, as against 22 minutes by electric train. Mr. J. M. McElroy, the general manager of the Corporation Tramways, has

Digitized by Google

spoken in high terms of the manner in which the women conductors work. Fewer complaints are lodged proportionately than against the men. There is, however, a desire to assist them by the public. There had been comparatively little illness among them. Before being employed they are examined by Dr. Catharine Chisholm. This lady has approved of the summer uniform, the main change in which is a short jacket and a straw hat.

NEWCASTLE-ON-TYNE.

DOUBLE-DECK CAR WITH FRONT EXIT.—ENFORCING TRAMWAY BY-LAWS.

So successful has been the working of single-deck cars with front exits that the Corporation tramways department have completed designs for the alteration of double-deck cars to this principle of unloading. Mr. E. Hatton, the general manager, is to be congratulated upon the success that has attended his enterprise in adapting single-deck cars to front exit working, and at the same time increasing the accommodation of these vehicles. In our issue of April 13 we gave a full description of what has been accomplished in that direction, the article being illustrated by four photographs. With a view to discourage the practice of crowding on to full cars, the tramways department are instituting prosecutions.

SHEFFIELD.

PASSENGERS' OFFENCES.—RETURN OF SOLDIER EMPLOYEES.—CONVEYANCE OF SCHOOL CHILDREN.—WOMEN AS CLEANERS.

The great increase of traffic and the presence of women conductors recently led to an increase in offences against the tramway by-laws, but thanks to prosecutions instituted by the department, the tendency seems to have been repressed. Some of the credit for this result is due to the magistrates, whose scale of penalties was 20s. for persons who attempted to avoid payment of fares, 40s. for riding past a stage and threatening a woman conductor who asked for the excess fare, and 20s. for boarding a car when the accused was intoxicated. In cases where tramway employees return to work from war service, the general manager, in dealing with wages rates and merit pay to them, will count as corporation service the period they have served with the forces. The Tramways Committee have agreed to convey about 100 children to and from the Whiteley Wood open-air school during the season, at a cost to the Education Committee of £275. The Committee have authorised the general manager to employ women car cleaners on night work at the depots, at the same rate of pay as men, viz., 7d. per hour, plus 2s. war allowance per week. The women are to work 45 hours a week.

DEPRECIATION RATES AT GLASGOW.

Glasgow Corporation have adopted a recommendation by the Tramways Committee that in making up the annual accounts of the department depreciation for the current year shall be at the following rates:—

Permanent way		£350	per mile.
Electric equipment of line	Average	2·9	per cent.
Ground		—	,,
Buildings and fixtures		2½	,,
Power station and sub-stations plant ...		5	,,
Workshop tools and sundry plant ...		5	,,
Cars	Average	8·2	,,
Electric equipment of cars		6	,,
Other rolling stock... ...	Average	16·4	,,
Miscellaneous equipment		5	,,

Councillor Battersby unsuccessfully moved that the recommendation that depreciation be at the same rates as last year be remitted back for further consideration. He contended it was true that the Corporation secured some of the money devoted to the depreciation fund. Treasurer M'Millan, in seconding, said that in a time like this, when the common good had been depleted for the last two years, the tramways department, which was really part of the common good, should reconsider the depreciation rate.

The Economical Production of Steam.—A nicely illustrated pamphlet is issued by Messrs. Scholey and Company, of 56, Victoria Street, Westminster, on "The Economical Production of Steam." This, it is pointed out, is secured by the use of the Taylor mechanical stoker and the Copes feed water regulator. As to the former apparatus, it is claimed that it increases the capacity of the boiler, burns fuel efficiently, has low maintenance costs, and reduces operating expenses. The two fundamental features of operation are underfeed and automatic cleaning. The coal is moved along by rams, there being no moving grate bars. In regard to the Copes feed water regulator, its principle is that the expansion of a tube controls the feed valve. The apparatus is nothing more than a special metal tube inclined on a bracket. One end of the tube is connected to the steam space of the boiler and the other end to the water space. According as steam or water predominates in the tube, the latter expands or contracts, and this movement operates the valve. Messrs. Scholey will be happy to give to inquirers further information than that contained in the pamphlet.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS FOR LETTERS PATENT.

The following applications for Letters Patent were filed previous to May 28, 1916:—

Electric locomotives (5,934)—British Thomson-Houston Company (*General Electric Company*).
Electric motor control systems (6,160)—British Thomson-Houston Company (*General Electric Company*).
Friction members of clutches and brakes (5,930)—T. Clarkson.
Clutch and brake-operating mechanism (5,935 and 5,936)—T. Clarkson.
Lifting-jacks (6,055)—L. E. Cowey.
Brake-slack adjusters for railway vehicles (5,871)—A. E. Hayward.
Points for tramways, railways, etc. (5,972)—R. B. Holt.
Motor vehicles (6,123)—R. F. Macfie.
Ticket delivery and checking apparatus (6,016)—A. Marsh.
High power and speed turbine plant (6,114)—Maschinenfabrik Oerlikon.
Automatic couplings for railway rolling stock (6,533)—P. T. Anslow.
Systems of control (6,292)—British Westinghouse Electric and Manufacturing Company.
Vibrating make-and-break devices for electric signalling (6,476)—A. C. Brown.
Air-brake apparatus (6,497)—California Valve and Air Brake Company.
Means for preventing side-slipping of road vehicles (6,366, 6,367, and 6,368)—F. H. Neate.
Electrically propelled vehicles (6,530)—C. J. Spencer.
Reversing controller for petrol-electric cars, etc. (6,249)—W. A. Stevens.
Vaporiser to burn paraffin oil as fuel for petrol engines (6,190)—F. Walker.
Electric motor control systems (6,639)—British Thomson-Houston Company (*General Electric Company*).
Form of transmission for motor vehicles (6,667)—J. W. Brown.
Power transmission for motor vehicles (6,729)—J. Casey.
Railway or tramway switch-operating mechanism (6,682)—A. Galston.
Power transmission for motor vehicles (6,729)—J. Henley.
Reversing mechanism for compound brakes (6,657)—W. Hildebrand.
Elevated railways (6,712)—W. Hinsen.
Resilient wheels for automobiles, traction cars, etc. (6,615)—A. Keay.
Reversing mechanism for compound brakes (6,657)—Knorr-Bremse-Akt.-Ges.
Automatic train-stopping mechanisms (6,814)—National Safety Appliance Company.
Air-brake systems (6,818)—National Safety Appliance Company.
Friction driving-gearing for motor vehicles (6,624)—J. T. Pickering.
Lubricating apparatus (6,845)—E. K. Wallace.
Lubricating apparatus (6,845)—J. L. Wallace.
Apparatus for protection of trains (7,137 and 7,138)—A. R. Angus.
Apparatus for controlling and stopping trains independently of drivers (6,989)—A. F. Bound.
Chassis construction on motor vehicles (6,905)—H. E. Buck.
Splash-guards for road vehicles (7,076)—G. Cheremisinoff.
Window cleaning devices for street cars (7,126)—H. J. Drake.
Wheel for road vehicles (7,044)—A. T. Eastman.
Combination brake and grinding shoe for vehicles with flanged wheels (7,082)—W. V. Edwards.
Metallic spring keys for railway chairs (7,142)—W. H. Flood.
Tramway systems (6,948)—P. Kenyon.
Railway vehicle controlling systems (7,040)—W. B. Murray.
Metallic spring keys for railway chairs (7,142)—C. Ross, Limited.
Apparatus for controlling and stopping trains independently of drivers (6,989)—W. Rowland.
Wheels for road vehicles (6,956)—R. Rutherford.
Tire or rim for wheels of road vehicles (6,968)—W. Spencer.
Combination brake and grinding shoe for vehicles with flanged wheels (7,082)—H. A. Stevens.
Sanding apparatus for locomotives (7,116)—G. H. Willans.
Spring mountings for vehicles (7,390)—Birmingham and Midland Counties Transport Company.
Means for joining railway rails (7,536)—T. M. Daniels.
Vehicle wheels (7,568)—Dunlop Rubber Company.
Life-saving guard for the front of mechanically-propelled vehicles (7,421)—W. M. Holdom.
Speed indicating apparatus (7,450)—E. Jaeger.
Vehicle wheels (7,568)—C. Macbeth.
Motor vehicles (7,519)—L. H. Pomeroy.
Motor vehicles (7,521)—A. R. Pullin.
Spring mountings for vehicles (7,390)—G. E. D. Ralls.

Digitized by Google

Motor vehicles (7,519)—Vauxhall Motors, Limited.
Detachable and self-locking device for automobile bodies (7,493)—F. G. Wiles.

Specifications Published.

1915.

Resilient tires (6,651)—Price.
Steering mechanism for automobiles, etc. (7,060)—Besserdich.
Trailers for vehicles (7,086)—Delaney.
Spring return mechanism for electric motor controllers (9,706)—Electric and Ordnance Accessories Company, Langrish and Hodgson.

FOR HIGH-CLASS
CONDENSING PLANT
WRITE TO
THE MIRRLEES WATSON CO., LTD.,
SCOTLAND STREET, GLASGOW.

ORIENTAL
TUBES—for every need
When buying tubes consult us—we supply tubes for every purpose, and can quote you keenest prices, and give prompt delivery.
We specialise in Seamless Steel Tubes for all purposes, and also make Electric Welded, Butt Welded, and Close Joint Steel Tubes. Send us your enquiries.
ORIENTAL Tube Co. Ld., West Bromwich
Telephone: 45, West Bromwich. Telegrams: "Tubes, West Bromwich."
SEAMLESS-STEEL-TUBES

Electrically-driven luggage truck (10,325)—Hamilton.
Means for preventing the skidding of motor cars and other mechanically-propelled road vehicles (10,457)—Morgan.
Air-brake systems (5,188)—Comerford and Hicks.
Rail joints (5,368)—Arboren.
Mud protector for use on motor vehicles (5,400)—Fairbrother (*J. B. Laggiard and Company*).
Vibrating make-and-break devices for use in electric signalling (7,840)—Brown.
Means for securing railway rails to sleepers (10,039)—Leyshon.
Tire-making machines (5,932)—Goodyear Tire and Rubber Company.
Electric signalling system for railways (6,542)—Mackenzie.
Change-speed driving gear (6,444)—Philipson, Philipson and Philipson.
Keys for securing rails in their supporting chairs (6,602)—Williamson.
Track ramps for signalling and train stopping apparatus (14,360)—Ballington and Shaw.
Wheels for road vehicles (14,364)—Oliver.
Electric signalling (3,520)—International Electric Company, Roose and Le Noir.
Resilient wheels (6,067)—Basjanoff.
Fire-boxes for locomotives, etc. (6,206)—Ducas.
Automatic signalling for tramways or electric railways (6,362)—Samaia.
Controlling mechanism for automobiles (6,469)—British Thomson-Houston Company (*General Electric Company*).
Change-speed gears (6,472)—Henroid-Schweizer.
Apparatus for cab signalling and for stopping trains independently of drivers (6,481)—Firth and Leake.
Railway signalling (6,601)—W. R. Sykes Interlocking Signal Company and Tarrant.
Rail joints (6,686)—Hill.
Vehicle wheels (8,036)—Madden.
Electrical installations, particularly applicable for use in motor vehicles (8,466)—Soc. Anon. des Etablissements L. Bleriot.
Means for cooling the engine of motor road vehicles (8,764)—Lucas.
Railway sleepers (8,916)—Livesey.
Friction brakes for motor cars (9,032)—Raffo.
Covers for pneumatic tires (12,380)—Taylor.

Thermit Rail Welding.—We understand that eight patents of Thermit, Limited, relating to rail welding have been suspended in favour of the British Thermit Company, Limited, Liverpool, to whom a licence is about to be granted under a royalty for the use of these patents in carrying out work themselves. This decision, we believe, in no wise affects the position of Thermit, Limited, who remain owners of the patents and will be able to supply the material or carry out the work in the same way as hitherto.

Colonial and Foreign Tramways Traffic Returns.

Name of Company.		1915. Weeks Ended May 1	May 8	May 15	May 22	1916. Weeks Ended April 29	May 6	May 13	May 20	Aggregate. Wks.	1916.	Increase or Decrease.
		£	£	£	£	£	£	£	£		£	£
Anglo-Argentine		50.995	54.791	53.137	53.193	52.781	54.938	54.974	52.485	21	1.028.646	+ 129
Auckland		20.216	(28 days)	20,447	(28 days)	20.767	(28 days)	21.202	(28 days)	44	231,906	+ 4,308
Burma	Rs.	3.707	3 488	3.496	3.827	3.641	3.732	3.911	3.859	42	—	+ 7.640
Calcutta	Rs.	59 956	60,878	61.831	65.031	63.336	69.152	65.636	65.765	21	1.353.219	+ 83.634
Madras	Rs.	...	(2 weeks)	29,228	...	...	(2 weeks)	29,191	...	22	310.815	+ 24,500

Companies Issuing Monthly Statements.

		1914. Dec	1915. Jan.	Feb.	March.	April.	May.	1915. Dec.	1916. Jan.	Feb.	March.	April.	May.	Wks.	Aggregate. 1915-16.	+ or -.
		£	£	£	£	£	£	£	£	£	£	£	£		£	£
Brazilian Street Mlrs.		...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Brazilian Traction Mlrs		6010490	5996190	5797500	6294910	6333460	...	6527000	6430000	6079000	6711000	6678000	...	18	25.898,000	+1,475,940
Brisbane		30.890	29.620	34.050	30.740	29.890	...	33,960	32.280	30.320	34.275	32.575	...	18	129,450	+ 12.610
British Columbia	$	674.063	640.495	558.512	557.135	...	...	603.667	591.949	572.935	577.117	...	...	39	4,982.147	— 772.894
Buenos Aires Pt. & C.		...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze		44.000	43.301	38.877	44.332	41.765	44,480	43.528	40,596	39.137	42,219	40,220	41.503	48	454,605	— 11.116
Cape Town		15.869	15.660	...	...	...	...	16.589	16.030	...	14,994	...	...	—	—	—
Carthagena & Herrerias		1.255	904	1.822	2.436	1.496	1.931	2.129	2.841	1,585	2.991	2.513	2.927	22	12.857	+ 4.268
Cordoba		12.091	11.945	11.534	12.746	...	...	13.025	12.329	11.831	13.598	...	...	52	161,906	+ 6.251
East India		1.839	1.914	1.649	1.846	1.864	...	2.062	2.015	1.863	2.196	2.116	...	39	18,706	+ 1.466
Kalgoorlie		2.905	2.372	2.352	...	...	...	3.018	2.236	2.248	...	...	...	9	4,484	— 240
La Plata		4.452	4.540	4.016	4.582	...	...	4.564	4.533	4.346	4.613	...	...	13	13.492	+ 362
Lima		32.411	33.043	30.164	34.185	31.633	...	34.685	34 014	32.900	34.159	33.556	...	18	134.629	+ 5.614
Manaos		...	...	...	...	...	...	...	...	...	157.156	...	...	—	—	—
Manila	$	132.500	...	...	119.984	...	...	141.350	...	...	124.750	...	...	—	—	—
Melbourne		...	62.729	59.086	...	...	...	72.658	69.879	69.395	...	...	...	9	139.274	+ 17,459
Mexico	$	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video		28.605	32.459	30.008	29.716	26.786	...	31.305	34.252	32.502	31.956	28.997	...	26	187,419	+ 12.764
Fort Elzabeth		...	...	...	...	...	...	4.360	4.193	3.857	...	...	...	—	—	—
Puebla	$	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Rangoon		4.459	4.689	4.991	5.217	4.964	...	4.492	4.763	4.674	5.501	4.849	...	18	19,787	- 74
Toronto	$	...	843.351	767.326	820.750	...	...	...	906.350	846.256	910.969	...	...	13	2,663,575	+ 232,148
Winnipeg	$	368.400	350.681	314.658	303.209	...	...	377.121	297.560	293.250	296.500	...	...	13	887.310	81.239

(Continued on page 452)

Digitized by Google

TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED. May 1	May 8	May 15	May 22	1916. WEEKS ENDED. April 29	May 6	May 13	May 20	AGGREGATE. Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdare	310	320	335	316	444	403	335	346	7	2.516	+ 177
Aberdeen Corporation	1,564	1,794	1,639	1,613	1.734	1.997	1.663	1.740	50	89.018	+ 5.628
Accrington Corporation	531	542	519	728	553	549	556	613	8	4,566	+ 45
Ayr Corporation	308	292	340	333	442	317	299	326	½	256	− 77
Bath Electric	*	...	...	...	...	...	...	...			
Birkenhead Corporation	1.326	1,315	1.327	1.368	1.569	1.420	1.433	1.516	7½	10.644	+ 748
Birmingham Corporation	12.762	12,915	12.940	12,996	17.916	15.680	15.827	16.362	7	116.426	+ 20 386
Birmingham Corp. Motor Omnibuses	745	786	748	774	1.176	833	838	971	7	6.398	- 823
Blackburn Corporation	1,172	1.188	1,252	1,240	1.953	1.328	1.166	1.166	7½	9 543	− 62
Blackpool and Fleetwood	393	439	369	416	1.249	620	419	478	20	8.246	− 949
Blackpool Corporation	660	1.113	700	699	3.381	1.546	827	844	7	9.416	− 2.507
Bolton Corporation	2.576	2.735	2,722	1,711	3.017	2.684	2.710	2.934	8	21 281	− 1.718
Bournemouth Corporation	1.988	2.011	1.861	2.684	2.394	2.055	2.075	2.264	8	17.372	− 160
Bradford Corporation	6,363	6,131	6.865	6,346	8.814	6.300	6.261	7.015	7	49.017	- 543
Brighton Corporation	971	999	984	1.067	1.431	1.066	982	1.191	7⅞	8.117	+ 546
Bristol	9,038	9,357	9,087	9,912	11.233	9.822	9.306	9.958	20	186.884	+ 10.264
Burnley Corporation	1,477	1,555	1,564	1,525	1.862	1.705	1.646	1.677	20	13.841	− 1.282
Burton-on-Trent Corporation	280	282	284	286	280	258	251	265	7	1.852	− 199
Bury Corporation	1,334	1,357	1.294	1,328	1.607	1.326	1.314	1.498	7⅞	10.641	+ 330
Cardiff Corporation	2,556	2 631	2,625	...	3.264	2.860	2.764	...			
Chatham and District	1,042	1,172	1,128	1,129	1.523	1.235	1.137	1.240	20	21.839	- 1.211
Chesterfield Corporation	247	265	250	249	365	271	257	268	7	1,939	+ 134
Colne Corporation	232	241	241	251	314	...	259	279			
Cork Electric	523	521	563	497	508	541	446	516	20	9.146	- 90
Croydon Corporation	1,726	...	...	...	1.403	...	...	...	4	5.417	− 666
Derby Corporation	959	1,001	1,021	1,046	1.273	1.048	1.084	1.156	7½	8.052	+ 411
Dover Corporation	264	297	288	301	343	306	281	315	8	2.160	+ 8
Dublin and Lucan	161	142	150	139	170	69	113	144	20	2.356	− 259
Dublin United	6,369	6.141	6,035	5,867	...	...	4.186	5.947	20	106.142	- 8.567
Dundee City	1,285	1,277	1,302	1,317	1.354	1.306	1.302	1.279	52	70.455	+ 3.902
East Ham Corporation	1,315	1,348	1,358	1,221	1.435	1.289	1.252	1.311	7½	9.221	- 219
Exeter Corporation	356	366	363	354	465	371	346	375	7	2.593	− 16
Gearless Motor 'Buses	*	...	...	...	...	...	...	...			
Glasgow Corporation	22.426	22.179	22.014	22,814	23.082	23.175	22.584	23.355	51	1.112.076	+ 78.070
Glasgow Subway	1,086	1,101	1,073	1,065	1.133	1.186	1.180	1.139	20	24.616	+ 2.783
Glossop (Urban Elec. Supply Co.)	119	137	124	126	154	138	136	140	21	2.765	+ 386
Halifax Corporation	1,957	2,067	2,105	2,083	3.159	2.280	1.932	2,072	6½	14.772	+ 33
Halifax Corp. Motor Omnibuses	46	48	46	47	64	44	39	42	6½	293	− 45
Hastings and District	872	902	902	864	1.552	1.026	865	974	20	16.236	− 453
Huddersfield Corporation	2.480	2,560	2,542	2,525	4.216	2.687	2.744	2.896	7	20.694	+ 2 461
Hull Corporation	2,998	3,027	2,882	3,082	3.044	3.002	3.033	3.131	7	21.899	− 815
Ilford U.D. Council	610	641	633	632	832	693	643	691	7	4.944	+ 461
Ilkeston Corporation	121	126	125	124	125	125	132	144	8	1.057	+ 39
Ipswich Corporation	425	441	427	512	573	441	459	511	7	3.440	+ 280
Isle of Thanet	310	334	323	457	502	314	263	340	33	8.756	− 1.415
Kilmarnock Corporation	164	165	211	170	182	171	199	121	1	122	− 48
Lanarkshire	1,870	1.855	1,831	2,001	2.576	2.400	2.112	2.184	20	43.020	+ 7.103
Lancashire United	1,629	1,640	1,690	1,703	2.563	1.793	1.658	1.696	20	33.015	+ 1.806
Leeds City	8,401	8,525	8,593	8,736	11.833	9.160	9.100	9.772	8	69.365	+ 8.107
Leicester Corporation	2,939	3,097	3,014	*	3.842	3.259	3 263	...	19	61.860	+ 7.467
Leith Corporation	706	716	717	577	827	774	810	627	1	627	+ 50
Leyton U.D. Council	1,516	1,620	1.619	1,683	2.009	1.559	1.465	1.553	7	11.181	− 329
Liverpool Corporation	13,123	13,340	13,333	13,402	14.877	14.024	13.952	14.125	20½	270.115	+ 13.823
Llandudno and Colwyn Bay	308	317	304	317	580	307	265	294	24½	5.450	− 226
London County Council	...	50,155	50.891	22,460	...	46.931	45,774	46,978	6½	315.496	+ 9.369
London General Omnibus	*	...	...	...	...	...	...	...			
London United	*	...	...	...	...	...	...	...			
Lowestoft Corporation	154	156	152	160	144	141	118	132	32½	4.231	− 1.220
Maidstone Corporation	178	205	198	197	257	219	187	206	7	1.562	+ 10
Manchester Corporation	17,326	17,777	17.595	17,759	20.066	18 406	17.971	18.559	7	132.715	+ 7.628
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...			
National Steam Car	*	...	...	...	...	...	...	...			
Nelson Corporation	184	170	183	180	273	194	187	208	7½	1.601	+ 207
Newcastle-on-Tyne Corporation	5,944	6,019	6,092	6,322	6.136	5.980	6.158	6.488	7	44.031	+ 968
Newport (Mon.) Corporation	815	804	806	835	1.030	866	856	944	7	6 502	+ 1.317
New St. Helens and District	957	902	938	895	1.426	972	855	902	46	45.639	+ 3.341
Northampton Corporation	701	804	731	731	894	747	697	680	7	4.859	- 331
Nottingham Corporation	3,436	3.510	3,539	3,454	4.362	3.692	3.617	3.777	7	26.186	+ 1.070
Oldham Corporation	2.290	2.244	2.223	2.387	2.894	2.267	2.321	2.615	8	20.519	+ 1.236
Portsmouth Corporation	2.399	2,502	2,451	2.474	3.297	2.638	2.496	2.678	8	19.023	-
Preston Corporation	873	922	914	898	1.185	1.099	1.045	1.044	6½	7.113	+ 680
Provincial	2.077	2.193	2,152	2.182	2.816	2.244	2.163	2.397	33	69.706	+ 4.514
Reading Corporation	710	751	777	748	902	844	786	794	6½	5.530	− 426
Rhondda Tramways	1,107	1.169	1,166	1.123	1.684	1.258	1.167	1,228	20	23 767	+ 1,354
Rochdale Corporation	1,594	1.697	1,620	1.682	2.025	1.647	1 658	1.747	7½	13.161	+ 574
Rotherham Corporation	1.044	1.023	1.056	1.483	1.352	1.292	1.360	1.434	7½	10.782	+ 2.203
Salford Corporation	4,996	5,108	4,998	5,510	5.680	5.144	5.206	5 758	7½	40.261	+ 2.575
Sheffield Corporation	8,494	8,449	8,437	8,650	11.439	9.652	10.036	10.673	8	82.208	+ 14.251
Southampton Corporation	1,324	1,383	1,446	1,409	1.770	1.615	1.511	1.491	6½	10.289	+ 590
Southend-on-Sea Corporation	684	777	887	759	1.214	755	688	705	7	5.127	− 559
South Metropolitan Tramways	*	...	...	...	...	...	...	...			
South Shields Corporation	720	723	735	769	892	728	735	805	7½	5.624	+ 332
Sunderland Corporation	1,369	1,396	1,426	1.460	1.592	1.376	1.456	1.612	7	11.202	+ 443
Sunderland District	591	574	546	559	889	527	494	541	29	16.532	+ 1 009
Swindon Corporation	173	197	195	192	255	201	188	189	6½	1.315	+ 53
Torquay Tramways	559	530	581	472	862	626	518	560	20	9.298	+ 72
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...			
Tyneside Tramways and Tramroads	562	570	582	613	675	514	507	546	20	10.130	- 428
Wallasey Corporation	1.177	1,212	1,164	1,220	1.658	1.282	1.207	1.301	7½	9.359	+ 446
Walsall Corporation	678	704	705	717	1.090	754	774	813	21	15.952	+ 2.211
Walthamstow U.D. Council	806	874	861	842	1.370	1.026	891	1.067	7	7.489	+ 1.373
Warrington Corporation	420	438	443	444	525	474	477	473	7	3.335	+ 353
West Ham Corporation	2.966	3.186	3.244	2.932	3.691	3.190	3.106	3.191	6½	22.115	− 934
Wigan Corporation	1.439	1.469	1.450	1.583	2.012	1.575	1.559	1.616	7	11.353	+ 612
Wolverhampton Corporation	1.080	1.037	1.020	1.580	1.160	1.138	1.159	1.241	8	9.393	+ 653
Yorkshire (West Riding)	1,534	1,646	1,452	1,583	2.410	1.779	1.803	1.736	21	34 851	+ 3.639

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

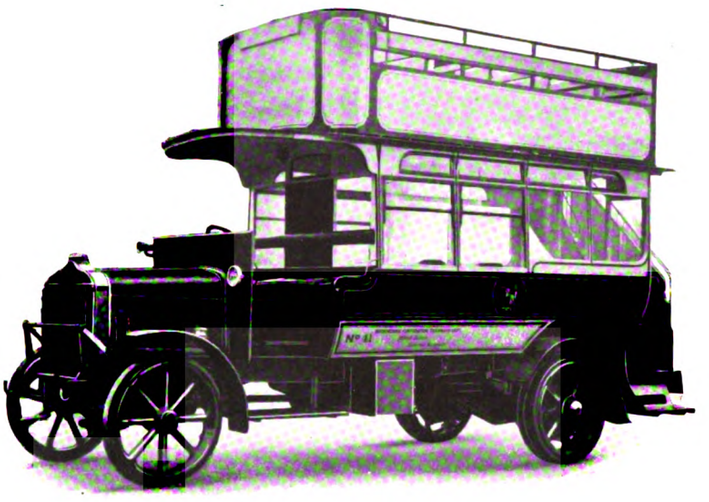
For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers).

For Places Abroad—
Thirty Shillings per annum.

Tel. No.: 2948 Gerrard.
Telegraphic Address: "Tramigro," London.

Amberley House,
Norfolk St., W.C.

Digitized by Google



As supplied to Birmingham Corporation

Daimler

Commercial Vehicles

RECENT CONTRACTS INCLUDE:

18	Vehicles	for	...	Birmingham
9	"	"	...	Walsall
11	"	"	...	Manchester
5	"	"	...	Sheffield
3	"	"	...	Rotherham
3	"	"	...	Halifax
2	"	"	...	Chesterfield.
2	"	"	...	Harrogate.

The Daimler Company, Ltd., Coventry

Depots at London, Manchester, Nottingham, Bristol, Leeds, Cardiff, Birmingham, and Newcastle.

Digitized by Google

BRITISH NAPIER BUILT

BUSINESS VEHICLES

Railway Delays!

These are **Acute** now. Be Independent by Purchasing a

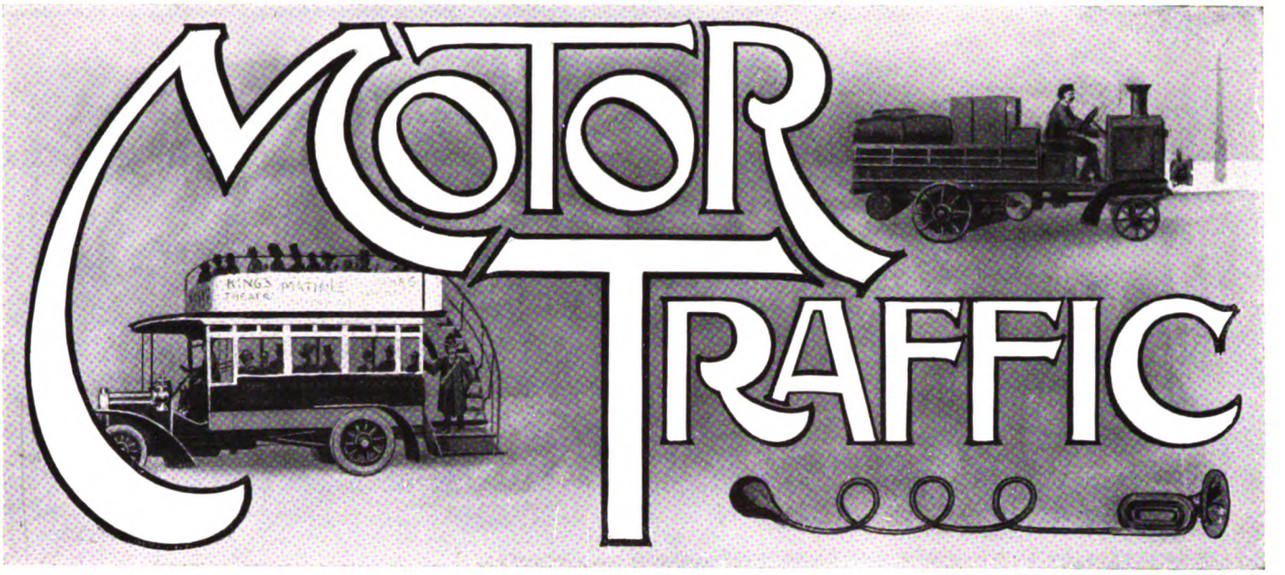
3½ TON NAPIER BUSINESS VEHICLE.

Full particulars from

WORKS:-
ACTON, LONDON, W.

D. NAPIER & SON, LTD.,
14, NEW BURLINGTON STREET, LONDON, W.

Digitized by Google



The relations of roads, road traffic, local authorities, and the State are more palpably in the melting-pot than they have been for a long time past, if, indeed, there has ever been any precedent for the present conditions. The machinery that existed before the war, having first been laid aside for a more or less indefinite period, is apparently now to be scrapped entirely, and there is no satisfactory indication available as to what there will be to put in its place. Possibly it is somewhat premature at present to speculate in this direction, but the events, both at home and abroad, of the past two years have given so much increased significance to the questions of roads and of the good control and maintenance thereof that curiosity on the subject is more than excusable. The hints dropped the other day by Mr. Hayes Fisher, Parliamentary Secretary to the Local Government Board, were hardly of a kind to inspire confidence in the future, so far as it may be dependent upon the wisdom and intentions of the Government. As to the abolition of the London Traffic Branch of the Board of Trade, little need be said. In the collection of statistics, and the formulation of standards, such, for instance, as that of "obstructive factors," it did extremely good work. Its usefulness, however, was severely limited by its purely advisory and recording capacity. It could only gather facts together, and make recommendations based thereon; and although its facts and its recommendations alike were unanswerable, nothing was and nothing could be done by it. If there were any promise in the suggestions outlined by Mr. Hayes Fisher that relative shams of this description were after the war to be succeeded by really comprehensive practical organisations, one would have welcomed them. Such, however, does not appear to be the case.

* * * * * *

It is now proposed that the Road Board should finally disappear, its funds and functions being taken over by a branch of the Local Government Board, which also would undertake, presumably, the work hitherto performed by the Traffic Branch of the Board of Trade. It is further suggested, although less definitely, that the questions involving roads and traffic, which, in their varied aspects, now come within the purview of four separate Government departments, might with advantage be concentrated in one. For this there may be something to be said theoretically, but there are many practical difficulties in the way of placing work previously distributed amongst four sets of people in the hands of one of that four. It is a much easier plan, and, in the circumstances now being considered, a desirable one, to create an entirely new authority, in which possibly the Road Board, the Home Office, the Board of Trade, and the Local Government Board can be either embodied or represented, as the case may be. It is inevitable that all the four departments must touch the main question of roads and traffic from their different angles; and such being the case, the argument for an entirely new authority is exceedingly powerful. It is, moreover, very necessary that the problems involved should be dealt with in the broadest possible way, unhampered by precedent or prejudice, and there can be no assurance in this sense if the work is to be done by any existing authority. There is, too, the question of the disposition of the funds of the Road Board, to which special conditions have always attached, subject only to suspension for the duration of the war. The administration of those funds cannot fairly be revised without reference to certain interests and certain arrangements made when the petrol and licence duties were first instituted. It will thus be seen that the balance of argument is very largely on the side of relegating any *ad hoc* consideration of these problems of roads and traffics to a separate and specially qualified body, and it would be difficult, if not impossible, to set up such an authority within any one Government department.

Those whose business it is to buy vehicles for Corporations, District and County Councils, and like authorities, are naturally becoming somewhat exercised in mind in regard to the clearly increasing difficulties in connection with fuel supplies. It is true that there is no visible likelihood that there will be any restriction whatever as regards the requirements of vehicles engaged on vital public services, but, obviously, the question of comparative cost is of the greatest importance, especially now, when municipal authorities are buying motor vans and motor appliances because of the war, with its widespread effects upon labour and on the supply of horses. That the needs of public health and similar work would come immediately next to those of the Army and Navy does, no doubt, relieve those concerned of a very large measure of anxiety. It cannot, however, and it should not, prevent the most serious consideration of this problem in its various aspects as they affect vehicles of the class referred to. In the first place, it must be remembered

Digitized by Google

MOTOR TRAFFIC.

that the obligation of economy in these matters rests upon all owners alike, whether they happen to be public authorities or private individuals, and the necessities of such authorities may in the last resort determine what proportion of their normal requirements of fuel ordinary users are to be allowed. The probability, therefore, though it amount to certainty, that whatever may happen there will be enough for street cleansing, fire-engine, and hospital purposes does not entitle Corporation and Council officials to regard themselves with any degree of detachment in these matters. Their ordinary duty demands that, whether on these "vital" services or any others, not a drop of spirit or an ounce of coal shall be unnecessarily consumed, which means in turn that there shall be no waste mileage of the vehicles. It is not suggested that there is anything approaching conscious or deliberate waste, but it would be impossible to assert that there is no waste at all, and it is more than probable that investigation on the right lines would show that in most places further reductions in fuel consumption and mileage are yet possible—in spite of efforts in that direction already made.

* * * * * *

Many users, however, who have not felt called upon to consider this matter in relation to vehicles already in service are experiencing some difficulty and hesitation in regard to new purchases, and in consequence the relative attractions of petrol, steam, and electricity as motive power are being discussed in borough and county departments with more vigour and detail than ever. So far as practical certainty of supplies are concerned, it may be affirmed that there is little or nothing to choose as between the three systems; any reasons that there might appear to be either for preference or otherwise are mainly theoretical. Thus it is, to all intents and purposes, a question of cost alone. At the present time, it must be said, there is much in the petrol situation that is calculated to give would-be consumers most serious cause for thought. It must be borne in mind, however, that present prices and circumstances are temporary, and while coal in general has not climbed to such an extent as spirit, there are reasons for believing that its after-war price will be appreciably nearer to that now ruling than will be the case with the latter product. On the face of it, therefore, there is no reason at present, and there probably never will be, for breaking up the homogeneity of now existent fleets of petrol vehicles by introducing steam for no other reason than fears as to petrol supplies. Still less are there present reasons for deserting steam in favour of electrics, inasmuch as the price of energy cannot remain indefinitely uninfluenced by the price of coal. In other words, the choice of the power agent in municipal transport must be decided on the same considerations as those which influenced policy in normal times.

How Motor Transport Assisted to Save Paris.—By the death of General Galieni on May 27 is recalled the brilliant work by which he assisted to save the French capital from the advancing Germans in September, 1914. As military governor of the city, he organised a field army, which was moved out of Paris by means of motor cabs, omnibuses, and every type of self-propelled vehicle. This force, under General Mannuowry, fell on a flank of von Kluck's army, and the result was felt at the battle of Ourcq, which was the turning point of the enemy's advance and his defeat at the Marne.

RAILLESS TROLLEY AND BATTERY VEHICLE.

A Combination of Promise for Goods Carriage.

In these days, when trackless trolley omnibuses and storage battery vehicles are commonplaces, it seems quite natural, once the thing has been done, that we should have a combination vehicle capable of running by power from tramway overhead wires where the latter are available, and also of being driven by energy from a storage battery carried on board when it is desirable to work the vehicle along routes where there are no tramways. The thing has now been done, and the credit for it belongs to Mr. C. J. Spencer, general manager of Bradford City Tramways. This first application of the idea is to a goods wagon, but there seems to be no particular reason why the principle, with certain modifications, should not be extended to electric omnibuses when the local circumstances render such a combination advantageous. Apart from any possible development for passenger service, it has already been made obvious that for the carriage of goods over routes partly occupied by tramways and partly without such facilities a wide field of usefulness should be open for wagons of this type. To take a concrete example, a factory may be situated half a mile or a mile away from the nearest tramway route in a town. It has to send to and to receive from a railway station two or three miles away quantities of goods and material. The railway station in its turn may be some little distance from a tramway route. The plan of conveyance with such a vehicle available as the Bradford wagon is quite simple. The vehicle loads up its goods at the factory, and runs by battery power to the nearest tramway. There the battery is cut off, the trolley is raised and put on the wire, and the wagon proceeds to the point on the tramways nearest to the station. Then the trolley is pulled down, the battery is turned on, and the wagon proceeds into the railway goods shed or yard, where its contents are transferred to the charge of the railway company. Material coming from the railway to the factory can be dealt with in a similar way.

A trial was given to Mr. Spencer's wagon on May 8, when it was found to work with smoothness and efficiency in every respect. The new vehicle is quite simple in design, but wonderfully adaptive to the purposes to which it is to be put. Taking the chassis of an old trackless trolley car, Mr. Spencer has built upon it a long, broad lorry (shown in our illustration), similar in shape and dimensions to the motor lorries which have become so familiar in recent times. One great difference is that it does not use petrol, which is so dear in these days. It thus has the advantage of reducing the demand for the precious petrol, minimising running costs, and at the same time contributing greatly to the public convenience at a time when there is so serious a deficiency in transport services.

The chairman of the Bradford Tramways Committee (Mr. Enoch Priestley) and several other interested persons witnessed the test of the vehicle. At the Thornbury tramway depot it was seen wheeling in and out with the facility practically of an ordinary motor car. A load of two tons was put on the wagon, and with this it made a satisfactory journey to Wibsey.

Digitized by Google

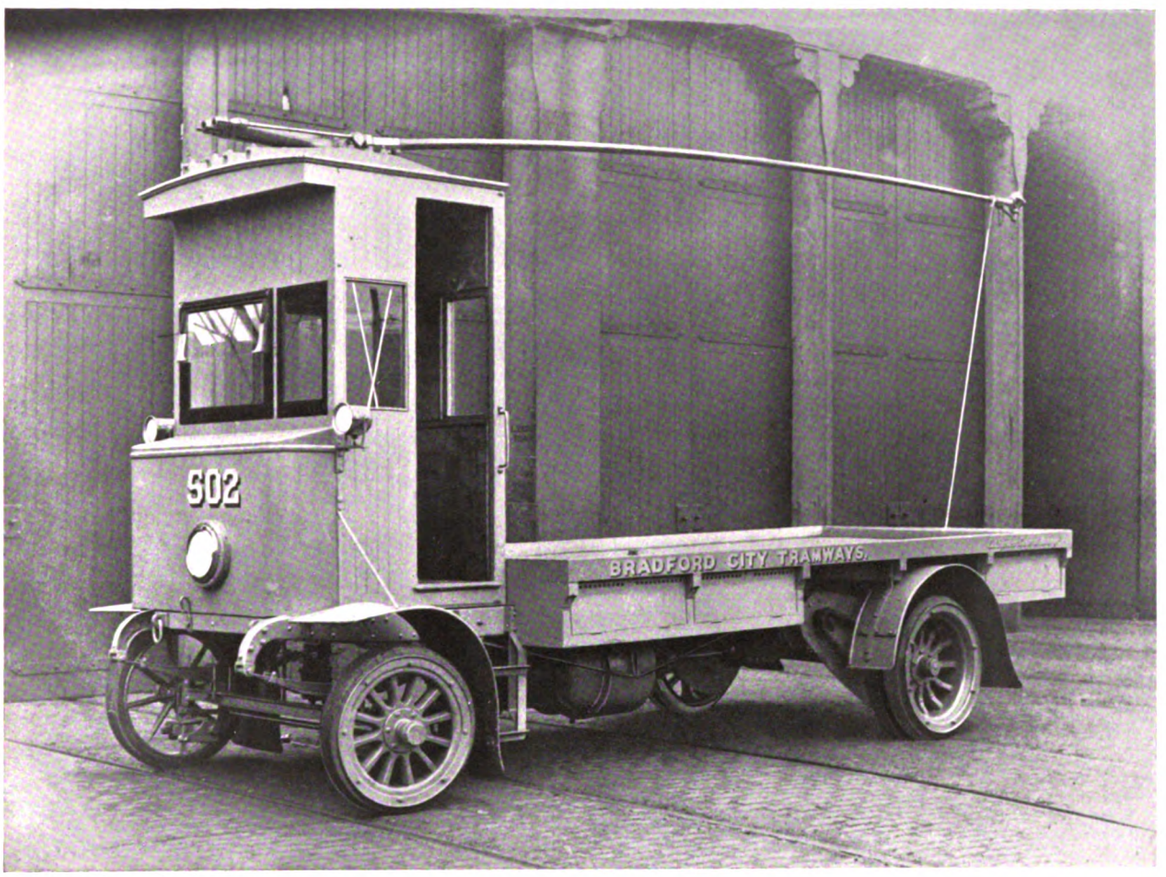
MOTOR TRAFFIC.

In recent times, of course, a great advance has been made in the adaptability of electric accumulators, enabling them to stand heavy rates of discharge for short periods and, on the other hand, to be charged very rapidly. This has enabled the new combined system of traction to be adopted. The wagon, as will be seen, is surmounted by a trolley pole to enable attachment to be made to the overhead wire, and earth attachment can be effected at will. Thus the wagon can be coupled up instantly with the tramway equipment and run at similar speeds, on the level or on rising gradients, as the passenger cars. When necessary, detachment can also be made instantaneously and the vehicle can be run short distances, up to a few miles, without any aid from the trolley wire.

To come to details, the equipment of the chassis is identical with that of the ordinary railless trolley chassis as used on the Bradford tramways; that is to say, two 20-H.P. motors with ordinary series-parallel control. It can therefore operate on a 500-volt circuit. The earthing device (for use when running on the trolley) is an extension of the steering arm of the vehicle bearing on the track by the medium of a cast-iron block and at the same time automatically steering the vehicle. This device, which has been used with considerable success for some time in connection with the Bradford ordinary trackless trolley cars when taking them over the tramway routes to the depot, was designed by the general manager of the Rotherham tramways, Mr. E. Cross.

The accumulators employed are of the Edison type (120 cells), giving a normal voltage of 150. They supply current to the ordinary 500-volt motors, the only difference being that the motor with battery supply runs correspondingly slower, that is, *pro rata* to the voltage, but as the torque of a series motor is proportional to the current passing through the windings, the vehicle is capable of climbing steep gradients but at a speed corresponding to the low voltage.

Whilst the vehicle is running on the 500-volt circuit the batteries may be in series with the motors, thus charging them whilst the car is in trolley service.



Bradford Tramways Department's Railless Trolley and Battery Lorry.

The battery is capable of running the vehicle about 10 miles. The change-over from battery to overhead wire is merely a question of throwing over a switch, the putting of the trolley on the wire, and the earth connector on to the steering gear.

It is obvious that, if the use of vehicles of this kind extends, a demand may arise for full speed when running on the battery. This, of course, would mean the use of motors designed to give the speed with the comparatively low pressure obtainable from the battery. To enable such motors to work at a similar speed when the 500-volt current from the trolley wire was being used, it would probably be necessary to carry a small machine of the nature of a motor-generator to reduce the trolley wire voltage. That, however, is a matter for the future.

Digitized by Google

MOTOR TRAFFIC.

ELECTRIC WAGON WORKING COSTS.

REPORT BY SHEFFIELD CLEANSING DEPARTMENT.

Mr. J. A. Priestley, superintendent of the Cleansing Department and Public Baths, Sheffield, has presented to the Cleansing Sub-Committee the following report on the working of the Edison electric battery tipping wagons owned by the department: —

The use of the electric battery vehicle for refuse collection in the city having now had some months' trial, I submit for your information the following particulars of the work done and the cost incurred, as compared with horse labour. The first vehicle was delivered in September last, and has been in regular work on day and night service for 21-22 weeks. The second vehicle was delivered in January, and has been similarly engaged for six weeks. The third vehicle, now on order, I am expecting to be delivered in the course of a few weeks. On day service the vehicles are engaged in the collection of bin refuse, and each employs one driver and three fillers, the former assisting also in loading where practicable. On night service ashpit refuse is collected, and each vehicle employs one driver and one filler, both men assisting in loading, the refuse in this case being shovelled into the vehicles from heaps previously wheeled out. Drivers are paid 33s. per week and fillers 30s. per week, with a war allowance of 5s. per week per man. Each vehicle is constructed to carry two tons. No. 1 vehicle was put to work on long distance journeys, and is principally employed on the High and Low Wincobank districts, the refuse being delivered at Lumley Street destructor. It has replaced three horses on each shift, but as two-thirds of the High Wincobank refuse was previously tipped at Wincobank, the extra distance covered by the vehicle is considerable, and could not have been done by the number of horses previously employed, and this fact should be borne in mind when the relative costs come to be compared. No. 2 vehicle is employed on comparatively short journeys, upon which horse-drawn vehicles are usually assumed to possess an unquestioned advantage. It has replaced two horses on day shift and three on night shift, the tipping being the same for both electric and horse wagons.

Although I propose to take the mean cost per ton for the two vehicles in comparison with the average cost over the whole city for horse labour, this is not strictly fair to the electrics, as the mean of the combined mileage is considerably greater than the average for the remaining districts of the city.

In arriving at the working costs of the electrics, I have included wages, vehicle costs, electricity, and tires. The first I have already given. The second comprises (1) capital costs, (2) insurance, (3) repairs, renewals, and maintenance, and (4) cleaning; and is, so far as the first and third items are concerned, an estimate only, as there is no experience available in this country on these points. As regards No. 1, however, the cost of the battery represents one-half the total cost of the vehicle, and as this is guaranteed to give 100 per cent. of efficiency after a mileage representing about eight years' constant running on night and day service, it is reasonable to suppose that the writing off of the entire cost of the vehicle in ten years is an under estimate rather than an over estimate of its working life; and for the same reason the estimate for item (3) representing practically 10 per cent. on the cost of the vehicle, exclusive of the battery, is a very liberal allowance considering the small number of working parts and the provision made elsewhere for tire renewals.

The consumption of electricity averages a fraction above 1½ units per mile (1·55), which is quite reasonable considering the hilly character of the city and the heavy nature of many of the undedicated roads traversed in collecting. A charge of 1d. per unit is made against the vehicles for current used, but this does not represent an actual expenditure, as the electricity is obtained from the destructor installation and the refuse consequently produces power for its own collection. The tires are guaranteed for 10,000 miles, and the renewals are amply provided for by an allowance of 1d. per mile. The details of the working costs are therefore as under: -

Wages (actual amounts paid).

Vehicle costs (p.c. £1,000): —	£	s.	d.
Interest and repayment of loan—10 years	123	5	10
Insurance	8	10	0
Repairs, renewals, and maintenance ...	50	0	0
Cleaning	8	4	8
	190	0	6

Electricity ... 1d. per unit.
Tires ... ... 1d. per mile.

Vehicle costs I have divided equally between the day and night work, and the other charges according to the wages paid, current consumed, and miles travelled on each class of work. For horse labour I have taken the current price paid to the Team Owners' Association for hired team labour. The results work out as follow: —

No. 1 VEHICLE. DAY WORK COSTS FOR 22 WEEKS.

Refuse collected ... ... 858 tons 6 cwt. 1 qr.

	£	s.	d.
Wages	154	15	8
Vehicle costs	40	7	1
Electricity 3,269 units	13	12	5
Tires—2,168 miles	9	0	8
	£217	15	10

Cost per ton, 5s. 0·8d.

COST OF ONE MONTH'S WORK ON SAME DISTRICTS WITH HORSE LABOUR.
Refuse collected, 167 tons 19 cwt. 2 qrs. Cost, £59 1s. 9d.
Cost per ton, 7s. 0·4d.

No. 1 VEHICLE. NIGHT WORK COSTS FOR 21 WEEKS.

Refuse removed ... ... 1,142 tons 19 cwt. 1 qr.

	£	s.	d.
Wages	72	3	8
Vehicle costs	38	10	5
Electricity 2,927 units	12	3	11
Tires 1,880 miles	7	16	8
	£130	14	8

Cost per ton, 2s. 3·4d.

COST OF THREE MONTHS' WORK ON SAME DISTRICTS WITH HORSE LABOUR.
Refuse removed, 473 tons 11 cwt. 2 qrs. Cost, £77 10s. 3d.
Cost per ton, 3s. 3·2d.

No. 2 VEHICLE. DAY WORK COSTS FOR SIX WEEKS.

Refuse collected ... ... 314 tons 4 cwt. 3 qrs.

	£	s.	d.
Wages	47	10	5
Vehicle costs	10	19	3
Electricity—670 units	2	15	10
Tires—417 miles	1	14	9
	£63	0	3

Cost per ton, 4s. 0·1d.

COST OF ONE MONTH'S WORK ON SAME DISTRICTS WITH HORSE LABOUR.
Refuse collected, 204 tons. Cost, £38 16s.
Cost per ton, 3s. 9·6d.

No. 2 VEHICLE. NIGHT WORK COSTS FOR SIX WEEKS.

Refuse removed ... ... 406 tons 13 cwt. 2 qrs.

	£	s.	d.
Wages	21	18	0
Vehicle costs	10	19	3
Electricity—758 units	3	3	2
Tires—459 miles	1	18	3
	£37	18	8

Cost per ton, 1s. 10·3d.

COST OF ONE MONTH'S WORK ON SAME DISTRICT WITH HORSE LABOUR.
Refuse removed, 440 tons 8 cwt. Cost, £55 10s. 2d.
Cost per ton, 2s. 6·2d.

The districts worked by this vehicle on day shift comprise the best in the city for horse labour, and from the results obtained I am led to the conclusion that for bin refuse collection in Sheffield horse labour holds an advantage where the total mileage per journey for the electrics does not exceed three miles, but beyond this distance, and at all distances on ashpit refuse, the electrics show a decided superiority.

Where electrics can only be used for day work the position differs somewhat, as the vehicle costs cannot be divided over two shifts, and the estimate of the working life of the vehicle under these circumstances will require careful consideration. In the collection of bin refuse also local conditions vary considerably; the carrying distance differs in different districts, as also does the distance from bin to bin, and these factors have an important bearing on working costs.

So far as Sheffield is concerned, however, I am of opinion that with our system of day and night work, the electric vehicle is a pronounced success, and I recommend the extension of this method of collection as opportunity offers, particularly as it renders possible a scheme which can be realised in no other way, viz., the centralisation of the work of the department with one depot and one destructor at Lumley Street capable of dealing with the whole of the refuse of the city.

The appended tables of the cost of collecting refuse by the electric vehicles for the past six weeks, in comparison with the cost for the same period by horse labour, are interesting and conclusive: —

BIN REFUSE.

	Weight Collected.	Cost.	Cost per Ton.	Cost per Ton, including Chain Horses.
	T. c. q.	£ s. d.	s. d.	s. d.
ELECTRIC	561 0 2	124 11 1	4 5·3	—
HORSES:				
Heeley Depot ...	2,090 15 3	489 0 10	4 8·1	4 9·9
Penistone Road ...	2,364 3 2	549 14 2	4 7·7	—
Worthing Road ...	2,458 0 2	600 3 0	4 10·6	5 0
All City	6,912 19 3	1,638 18 0	4 8·9	4 9·9

Digitized by Google

MOTOR TRAFFIC.

ASHPIT REFUSE.

	Weight Collected.	Cost.	Cost per Ton.	Cost per Ton, including Chain Horses.
	T. c. q.	£ s. d.	s. d.	s. d.
ELECTRIC	777 12 1	76 16 8	1 11·7	—
HORSES:—				
Heeley Depot ...	1,400 4 1	210 14 7	3 0·1	3 3·5
Penistone Road ...	1,406 5 3	200 2 3	2 10·1	—
Worthing Road ...	870 14 1	109 0 11	2 6	2 9·7
All City	3,677 4 1	519 17 9	2 9·9	3 0·1

For all refuse combined the costs work out for electrics at 3s. 0·1d. per ton, and for horse labour at 3s. 9·2d. per ton, after making the necessary corrections in the latter case for the same proportionate ratio of bin to ashpit refuse as in the case of the electrics.

The following table is interesting as showing the average weight of refuse collected over the whole city per horse per day, in comparison with the work done by each electric:—

	Tons per Day per Horse.	Tons per Day per Electric.			Value in Horses.		
		No. 1.	No. 2.	Averge.	No. 1.	No. 2.	Averge.
Bin Refuse ...	3·39	7·05	8·73	7·90	2·08	2·57	2·33
Ashpit Refuse	3·94	10·30	11·29	10·80	2·61	2·86	2·74
Both	3·56	17·40	20·02	18·72	4·88	5·62	5·25

THE NEW TAXES.

The A.A. and M.U. have approached the Chancellor of the Exchequer and recommended:—(a) Reduction of the proposed increased tax on the 16-26 H.P. class of car; (b) relief for old cars; (c) abatement or exemption where cars are used for public work; and (d) modification of the proposed taxes on motor cycles and the rejection of the horse-power basis for this class of vehicle.

In the House of Commons recently the Chancellor of the Exchequer was asked to announce the nature of the exemptions under the new taxation of motor cars, and the conditions attaching thereto, especially vehicles used for purely commercial purposes. Mr. McKenna replied:—It is not proposed to interfere with the existing exemptions. These are as follow:—Trade cars, fire engines, motor cars used by a local authority for fire brigade purposes, ambulances, and cars brought into the United Kingdom by a person making only a temporary stay are totally exempt. Motor vehicles kept by a duly qualified medical practitioner for the purposes of his profession are chargeable with one-half of the duty. I am considering whether it is possible to extend exemption to cars used exclusively for public purposes.

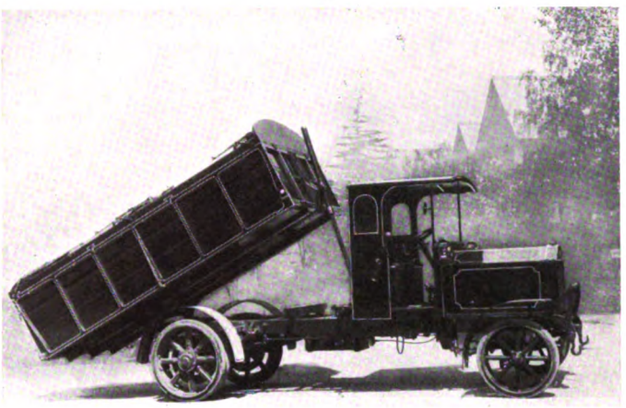
FLEET STREET MOTOR CENSUS.

The tenth annual census of motor traffic in Fleet Street, London, was carried out on April 19 by *Motor Traction*. The results published in our contemporary on May 24, show that 2,643 omnibuses passed in both directions during the day, being a decrease of 101 as against last year, and a fall of 908 from the record figures of 1914. On the other hand, motor trade vehicles show a further notable advance, the number being 468, as against 360 for 1915, and 189 for 1914. As compared with a total of 62 for 1911, industrial motor vehicles in this area have increased over 650 per cent. For the first time mechanical traction exceeded 50 per cent. of the total traffic counted. Nine years ago it represented only about 11 per cent. There was a decrease of about 1 per cent. in the number of vehicles of all kinds as compared with the last census before the war. Military needs occasioned a fall of 313 in motor cabs since the last census, when those vehicles numbered 1,691. Private cars had fallen from 236 to 165. A horse omnibus has not been seen in Fleet Street since 1911.

OXFORD OMNIBUS COMPANY SUED FOR EXTRAORDINARY DAMAGE.—In the King's Bench Division on May 9 counsel for Abingdon Rural Council applied for postponement of the hearing of their action against the City of Oxford Electric Tramways Company for damages caused by the extraordinary traffic of motor omnibuses. Counsel said it was necessary to prove the number of omnibuses. Plaintiffs had not been able to get the information from the time tables, and so it would have to be obtained by interrogatories. Mr. Justice Scrutton directed the case to stand over, with liberty to apply.

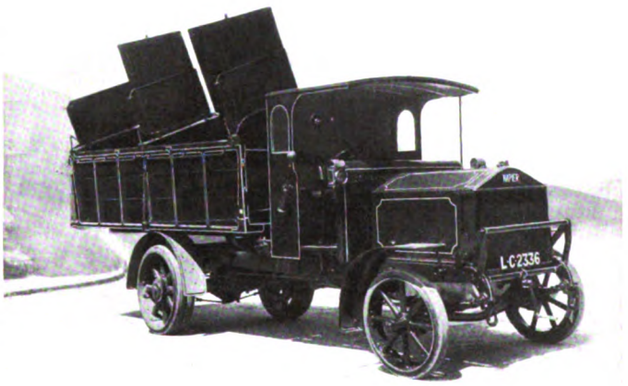
NAPIER CHASSIS FOR DUST VANS.

The two 3½-ton Napier chassis illustrated below have recently been supplied by Messrs. Chalmers and Company, of Redhill, the agents of D. Napier and Son, Limited, to the Royal Borough of Kensington. The body is one of Messrs. Chalmers and Company's patent dust van bodies. The frame is of the best seasoned timber; all ironwork and tipping plates being of steel. A telescopic screw



Chalmers' Patent Body on Napier Chassis.

is fitted, so that the van will tip up and enable all refuse to be discharged; two lids are fitted on each side of the roof, and are made to open separately and automatically, and steel wind shields are fitted to obviate the blowing about of refuse when it is discharged into the body, which is an excellent contrivance from a sanitary point of view. The screw and tipping is made so that the body is easily detachable from the chassis; the driving cab is a fixture, and goes well over the seat. The machines are of a very useful



Steel Wind Shields of the Napier Dust Van.

type, and at the present time should be particularly serviceable to the borough in carrying out their work, owing to the shortage of men. The Corporation already possess a 3½-ton Napier, which, we understand, is giving the utmost satisfaction.

AMERICAN MOTOR VEHICLES FOR INDIA.—The Washington correspondent of the *Mysore Economic Journal* reports that the motor vehicle manufacturers in several States of North America have combined to send six smart travellers to push their goods of every description in the principal cities of India.

Digitized by Google

MOTOR TRAFFIC.

STRAKER FIVE-TON WAGON.

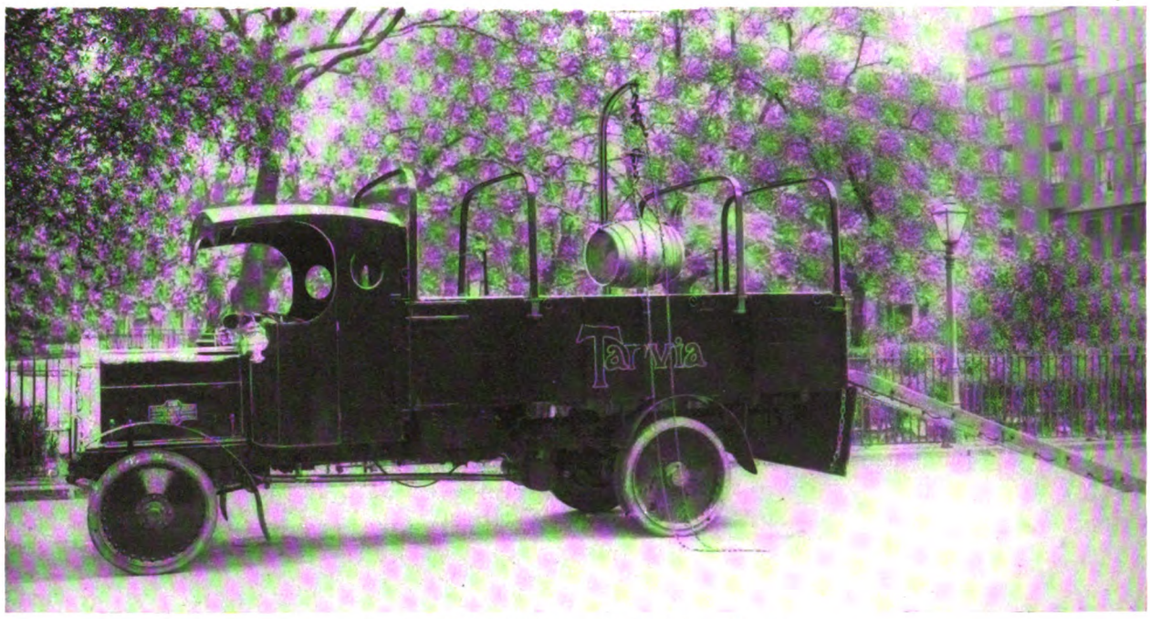
The 5-ton "Straker" wagon illustrated below has just been delivered to Messrs. Bristow and Company, of Tothill Street, Westminster. It is specially fitted for handling tar barrels. The body, which is self-contained, is provided with detachable hoop-sticks for carrying the tarpaulin cover. These are fitted into sockets on the sides, an additional long socket being provided at the front end of the body, into which all the hoop sticks can be placed when it is desired to remove them for loading. Detachable stanchions are also fitted in order to carry chains, which allow several extra tiers of empty barrels to be carried above the sides of the body.

An important feature in the equipment of the wagon is the detachable jib crane, which can be fitted into sockets on either side of the wagon for the purpose of loading or unloading. As will be seen from the illustration, a small pulley block is attached to the end of the jib, so that by means of the block chains the driver is able to raise and lower the heaviest tonnage by himself, thereby being independent of outside assistance.

The body is mounted upon the Straker-Squire "CO 6" model chassis, which has a normal carrying capacity of five tons, exclusive of the weight of the body and equipment. The overall length of the chassis is 20 ft. 1 in., and it is fitted with a 45-H.P. engine. The cylinders are cast in pairs 120 mm. bore by 140 mm. stroke. All the valves are interchangeable, and are located on the same side of the cylinders, being operated by one cam shaft. The crank case is so arranged that the bottom part can be dropped without interfering with the crank shaft bearings, of which there are three. The lubrication is entirely automatic; a pressure gauge on the dashboard gives the pressure of oil in the system, and also indicates its correct working. Control of the engine speed is given by means of a governor in conjunction with a foot pedal, which acts on the engine throttle. A small lever is fitted to the dashboard for setting the engine at a low speed, all acceleration being then controlled by the foot pedal. An efficient cooling system is maintained by means of a centrifugal pump driven by helical wheels. The radiator, of the gilled tube type, is designed to be easily dismantled for examination or repairs.

The gear-box provides four speeds forward and a reverse, the direct drive being on the top speed. The ratio between top and bottom speed is four to one, all speeds being operated by a single lever working in a gate situated at the driver's right hand. The transmission from gear-box to back axle is by cardan shaft to a live axle specially designed to carry its load. The drive is transmitted through two shafts direct to the road wheels, which rotate upon the stationary axle at the ends of the tubular arms; thus the shafts do the driving only, and carry no portion of the weight of the vehicle or its load.

An important feature in the design of this model is the fact that special attention has been paid to accessibility, so that any working part can be readily examined and taken down for repairs or renewal without disturbing other parts of the chassis.



Straker 5-Ton Wagon with Hoisting Gear.

MOTOR OMNIBUS RESTRICTION.

The House of Lords on May 9 agreed to the amendments which the Commons made in the new clause inserted in the Local Government (Emergency Provisions) Bill in Committee in the House of Lords. The object of the clause was to prevent omnibuses and chars-a-bancs plying, without the consent of the highway authority, on any route which had not been regularly used within one year prior to March last. The Commons made the period two years. A report of the proceedings in the two Houses was published in our issue dated May 11.

Mr. R. S. Tilling, speaking from the chair at the annual meeting of Thomas Tilling, Ltd., on May 10, said:—I should like to correct some statements I have seen in the public Press to the effect that the motor omnibus pays nothing in taxes. As a matter of fact, with the 3d. per gallon duty on petrol, the licenses, etc., the contribution amounts to more than ½d. per mile. This sum, if applied to the upkeep of the roads, would more than cover the most extravagant estimate of the extra wear caused by a motor omnibus. The contention of some of the road authorities that the traffic should be made to fit the road, and not the road to fit the traffic, is a most retrograde idea, and if this had been adopted in the past it would mean that we should be still using sedan chairs and saddle horses. Again, to put an extra tax on the vehicle which carries passengers and exempt the one that carries goods is most illogical.

Under the Local Government (Emergency Powers) Act the Croydon Corporation have passed the following resolution:—"The use by any omnibus of any route that has not been used within two years prior to March 1, 1916, without the consent of the Corporation, or, if unreasonably withheld, of the Local Government Board, is forbidden under penalties."

Southend Council are considering the question of placing restrictions on omnibuses serving Leigh and outlying localities.

Collapsible Hood for Omnibuses.—A new illustrated catalogue of the Beck patent collapsible hood for motor omnibuses and other vehicles has been issued by the Willesden Paper and Canvas Works, Limited. A feature of the publication is that it reveals the simple and effective manner in which Mr. F. Beck, the patentee and manufacturer of the hood, has met our objection that the hood, when lowered, obstructed the front destination board. This drawback has been overcome by advancing the front board and moving the front seat on either side four inches towards the centre. The space thus provided at the sides accommodates the hinges of the framework, while the hood, when collapsed, rests between the advertisement board and the front barrier of the top deck. When closed the hood is thus entirely hidden from view. Another advantage is that the alteration gives additional space for advertisements upon what is the most prominent portion of the vehicle, namely, the side space immediately over the driver's canopy. Mr. Beck is deserving of congratulation upon the perseverance he has shown in perfecting an appliance that will have the effect of increasing earnings.

Digitized by Google

MOTOR TRAFFIC.

THE USE OF PRIVATE CARS.

The evidence that has been collected by the Royal Automobile Associated Clubs shows that motoring for purely pleasure purposes has practically ceased. At least 100,000 cars have been used for war work during the last twelve months, almost entirely in a voluntary capacity. The work undertaken included the taking of wounded soldiers, at all hours, to and from railway stations, hospitals, entertainments, and for pleasure rides; assisting the police; driving military officers in the performance of their duties; assisting recruiting; taking helpers and supplies to and from Y.M.C.A. huts, munitions buffets, etc.; and generally giving any help the authorities desired.

Car owners have carried no less than 1,020,300 wounded sailors and soldiers up to April last from trains to hospitals, or between hospitals, and in doing so have driven their cars 4,591,650 miles. This work alone has represented a cost to themselves and a saving to the country of about £114,790, and, further, an actual revenue to the country of £7,650 in the tax paid on the petrol consumed. This excludes all consideration of pleasure rides given to convalescent soldiers, which far exceed these figures.

The county surveyors are practically unanimous that the use of private motor cars is much less than in normal times, but that the volume of motor traffic upon the roads has greatly increased, due to the additional commercial vehicles and the military traffic. The county directors of the Territorial V.A.D. organisations have supplied reports of the assistance given to the British Red Cross Society. Great activity by car owners is indicated by the reports of the work of the specially organised bodies to assist in war work. The fact that trade consequent upon purely pleasure driving at the present time is practically non-existent, is emphasised in the reports received from garages and traders.

Bradford Council contemplate purchasing a third motor gulley emptying machine. Besides doing the work at great speed and inoffensiveness, the machines effect a saving of 90 per cent. in repairs caused by gullies becoming choked. The Corporation are likely to place an order for several motor road sweepers when national needs permit the machines to become obtainable.

THORNYCROFT LORRIES AWAITING DELIVERY.

Messrs. John I. Thornycroft and Company, Limited, of Caxton House, Westminster, S.W., in their inland and seaport works, have long specialised in the construction of commercial motor vehicles and marine motor craft. In the former department they were foremost in meeting the requirements of the War Office by providing a type of vehicle for which a Government subsidy was given to the purchaser, conditional upon the machine being placed at the service of the nation in a time of emergency. It is not surprising therefore to find that the naval and military authorities have made large demands upon the products of the Thornycroft works during the past nineteen months, and that orders have also been received through the War Office for the Dominion and Colonial Governments, notably for the Commonwealth of Australia.

The class of vehicle is the 40-h.p. type "J" 3 to 4 ton lorry, which has greatly enhanced its reputation as the result of the severe service to which it has been put both in the war area and for heavy work in munition and military training areas in this country. It is the standard type produced at the Thornycroft works, and long before the war it had gained a name for reliability under the trying conditions of Colonial use.

An idea of the great output of this type by one of the Thornycroft establishments will be gathered from the photograph reproduced on this page, showing a large fleet of 40-h.p. type "J" 3 to 4 ton lorries awaiting delivery.

A Fleet of 40-h.p. Lorries at Thornycroft and Company's Works.

MOTOR COMPANIES' DIVIDENDS.

Belsize Motors, Limited.—An interim dividend of 4 per cent. is announced on the ordinary shares.

Fiat Motors.—The net profits for the past year were £6,854, and £5,974 was brought forward. A dividend of 1s. 6d. per share is proposed, carrying forward £8,185.

John I. Thornycroft and Company, Limited.—On account of the financial year ending on July 31 next the directors announce a dividend of 3 per cent. on the preference shares and 1s. 6d. per share on the ordinary shares, less income-tax.

Digitized by Google

MOTOR TRAFFIC.

PETROL SUPPLIES TO BE REGULATED.

COMPULSORY CENSUS OF MOTOR VEHICLES AND FUEL.

On June 1 the Privy Council issued the following regulation under the Defence of the Realm Act in order to provide for a census of petrol supplies :—

Every person who uses or keeps motor spirit, whether for the purpose of supplying motive power to motor cars or for any other purpose, shall supply such information in relation to the motor spirit used or kept by him, and the purposes for which and the manner in which it is used or kept by him, as the Board of Trade may by any general or special order require, giving such particulars in such form and at such times as the Board of Trade may by order direct ; and if any person fails to comply with this regulation, or with any order made by the Board of Trade thereunder, or knowingly gives any false information, he shall be guilty of a summary offence against these regulations.

For the purposes of this regulation, motor spirit has the same meaning as in section 84 of the Finance (1909-10) Act, 1910.

THE FORTHCOMING CENSUS.

The Petrol Committee of the Board of Trade on June 2 issued a notice that it is their intention shortly to take a census of motor vehicles and of petrol consumption and requirements. In the meantime a sub-committee, consisting of representatives of the chief distributing organisations, have undertaken at the request of the committee to regulate the supply of petrol according to the classification shown below. The items in each class are arranged in alphabetical order. It is not anticipated that there need be any curtailment at present of reasonable demands in Classes A and B.

ORDER OF PRIORITY FOR THE DISTRIBUTION OF MOTOR SPIRIT.

Class A includes requirements for or by carriage of munitions of war or materials for munitions of war ; fire brigades and ambulances ; Lords Lieutenant, High Sheriffs, and any services certified by a Government department to be essential ; medical practitioners ; motor cars used by or under the authority of the Red Cross Society or the St. John Ambulance Association or any other society approved by the Admiralty or Army Council for the conveyance of wounded or sick members of any of His Majesty's forces ; police and local government authorities ; veterinary surgeons.

Class B includes requirements for or by agricultural machinery ; aircraft ; conveyance of goods ; industrial processes ; motor cabs plying for hire ; motor cars used by commercial travellers for business purposes ; motor fishing, cargo, and passenger boats other than boats running pleasure services ; motor omnibuses, excepting those running pleasure services ; railway companies ; stationary engines (including lighting sets).

Class C includes all requirements not covered by Class A or Class B, such as chars-a-bancs and other passenger vehicles running pleasure services ; motor boats running pleasure services ; motor cars standing for hire in garages, livery stables, hotels, etc.; private motor cars and motor cycles in ordinary use.

WARNING AGAINST ILLEGAL STORAGE OF SPIRIT.

A statement was published by the Petrol Committee of the Board of Trade on June 2 drawing the attention of owners of motor vehicles and other users of motor spirit to Section 7 of the Petroleum Act, 1871, and to the Regulations dated July 31, 1907, made by the Secretary of State under Section 5 of the Locomotives on Highways Act, 1896, which limit the amount of motor spirit that may be stored without a licence. The committee have received information that in certain cases a quantity of motor spirit in excess of the prescribed amount has been stored, and they wish to impress on users of motor spirit the fact that contravention of the above section and regulations renders the offender liable to heavy penalties.

THE SUPPLY OF COMMERCIAL VEHICLES.

STATEMENT BY THE MINISTER OF MUNITIONS.

Mr. MacVeigh, M.P., on May 23, asked the President of the Board of Trade whether he is aware that motor manufacturers in this country, while supplying the Government with commercial vehicles on the basis of supplies being stopped at six weeks' notice, are under restrictions as to the sale of the surplus material thus left on their hands ; whether he is aware that foreign firms are not placed under any such restrictions ; and whether steps will at once be taken to remove the penalising restrictions so as to leave the home manufacturer unfettered as to the surplus ?

The reply was given by the Minister of Munitions (Mr. Lloyd George) as appended :—The answer to the first part of the hon. member's question is in the affirmative. In the case of firms whose output is controlled, the surplus of commercial motor vehicles, after the war requirements of the Government have been supplied, is available for private customers, subject to the approval of the War Office or the Ministry of Munitions, who endeavour to arrange that commercial motor vehicles shall be released to applicant firms in their order of importance for munition and national purposes. The suggestion made in the latter part of the question will be considered, but owing to the many important issues involved, it is not possible to give any undertaking at present.

BOURNEMOUTH OMNIBUS SERVICES.

In his report on the working of the tramways department for 1915-16, Mr. I. Bulfin, the general manager, makes the following reference to the motor omnibus services : —" The omnibus from Westbourne Arcade to Alum Chine has been in service the whole year, the total receipts for which amount to £503 18s., the passengers carried 72,531, the car-miles run 13,529, the receipts working out at 8·93d. per omnibus mile.

" The omnibus from Boscombe Arcade to Boscombe Pier was run from April 2 to October 2. The receipts amounted to £409 5s. 3d., passengers carried 98,223, car-miles run 7,439, the receipts working out at 13·20d. per omnibus mile.

" The omnibus from Cemetery to Queen's Park Avenue and Markham Road was in service from May 22 to July 30 ; the receipts amounted to £71 11s. 11d., passengers carried 17,183, and the car-miles run 6,142. The receipts only averaged 2·79d. per omnibus mile. Acting on your instructions this omnibus was withdrawn, and placed from August 1 to August 25 on the Square and Pier route. During this period the receipts amounted to £43 19s. 5d., the passengers carried to 10,553, the car-miles run 1,147, and the receipts per omnibus mile to 9·19d. Owing, however, to the very heavy reduction in staff, it was found impossible to continue this omnibus in service. I have still no doubt that this route, if properly nursed, would equal the Boscombe Arcade to Pier route.

" The total running expenses of all the omnibuses amounted to £1,151 17s. 8d., and the total receipts to £1,035 6s. 5d., leaving a deficit of £116 11s. 3d., to be met by the tramways.

" During the winter months a lorry body has been fitted and fixed to one of the omnibus chassis, and has been used for carting purposes in the district. It has proved very satisfactory."

REFUSAL OF LICENCES AT BRIGHTON.

It will be remembered that in January last Messrs. Thomas Tilling, Limited, applied to the King's Bench Division for a rule nisi against the Brighton Corporation directing them to show cause why they should not hear and determine an application for licences for omnibuses, on the ground that the Corporation had not properly exercised their discretion under the Town Police Clauses Act, 1847. The court, presided over by the Lord Chief Justice, refused the application, on the ground that the Council had been guided by the opinion of the Chief Constable, and had not therefore acted from bias.

Messrs. Tilling have since applied for licences to ply for hire with fourteen omnibuses, the application being supported by a memorial signed by 12,000 persons, although there is a company already operating motor omnibuses. The Watch Committee have recommended the Council not to grant the application, as the Chief Constable has reported that he objects to the licensing of competing omnibuses.

The Council decided to defer their decision until the June meeting, in consequence of the receipt of a joint letter from Messrs. Tillings and the Brighton and Hove Omnibus Company, asking for a postponement to enable the two companies to hold a conference.

THE DUPLICATION OF LONDON SERVICES.—Replying to a question addressed to him in the House of Commons on May 31, Mr. Hayes Fisher, Parliamentary Secretary of the Local Government Board, said no decision had yet been reached by the conference between the County Council and the London General Omnibus Company on the avoidance of waste owing to the duplication of passenger services in London.

Digitized by Google

MOTOR TRAFFIC.

THOMAS TILLING, LIMITED.

The report for the year ended December 31 last shows a profit of £83,392. Adding the amount brought forward, £17,186, there is a sum of £100,578. Interest on debentures and income debenture stock requires £14,000; interim dividend on preference shares, £8,250; reserve fund to cover decline in market values of investments, £594. The directors recommend a dividend of 12 per cent., less income-tax, on the ordinary shares. This will entitle the income debenture stockholders to additional interest at the rate of 1⅝ per cent. for the year, leaving the sum of £49,434 to be carried forward. The directors have considered it advisable to carry forward a larger sum than usual in view of the difficulties of trading at the present time, and the uncertainty with regard to taxation. The price of many of the commodities used in the business have been abnormally high during the year, thus rendering some portions of the undertaking unprofitable, but the directors feel confident that the shareholders will be satisfied with the result of the year's trading considering the difficulties of the present circumstances.

At the annual meeting on May 10, Mr. R. S. Tilling, the chairman, said that the net results of the year's trading had been quite satisfactory, and they had been able to justify the statement made three years ago, when they issued the income debenture stock, that the fresh capital would enable them to pay a higher dividend. The year 1915 was the first complete twelve months during which the full effect of that issue was felt. One section of the business—the horse part—had, however, been quite unprofitable; forage of all descriptions had continually advanced in price; labour, horse renewals, shoeing, etc., had increased likewise. There was a time not long ago when the horse side helped the mechanical to get on its feet, and now it was the mechanical side which had helped the horse. This company were the pioneers in the employment of women conductors in London, and the experiment had been quite successful. They were paying the women at the same rate as they paid the men. The public liked the innovation, as the women were intelligent and attentive. They had lately built a large garage at Croydon, especially fitted for the employment of women labour. After a reference to the question of the motor omnibus and taxation (which is given in another column), the Chairman mentioned that several of their works were now under Government control for war purposes. Nearly 800 of their men had voluntarily enlisted. Replying to a vote of thanks to the directors, the chairman said that the past year was his fiftieth year in the business, and it was the most successful they had experienced.

OMNIBUSES AND ROAD MAINTENANCE.

Recently Sheffield tramways department extended their motor omnibus service to Eckington for the convenience of munition workers, although it is stated that the Corporation do not possess powers to run to that locality. The sum of ⅜d. per car mile is paid to the County Council for road maintenance, which is equivalent to a sum of £120 per annum, whereas it is estimated that an outlay of between £1,000 and £1,200 per mile will be necessary to repair the roads. The County Council has disregarded the request of the Parish Council that no obstacle should be placed in the way of the extended service.

The London General Omnibus Company have renewed their application to Romford Council for sanction to running their vehicles in that authority's area. The surveyor reported that an outlay of £4,000 would be necessary to fit the roads for such traffic, and he advised that the question should be deferred for a year. The Council declined to accede to the application, and appointed a committee to inquire as to the feasibility of running their own omnibus service.

Epping Rural Council have asked the Local Government Board to receive a deputation to urge the restriction of the use of the country roads by omnibuses, especially on Sundays, in view of the great cost for road repair, and also the use of motor spirit. On Sundays about 300 omnibuses visit Chigwell.

Electrical and Petrol-Driven Tower Wagons.—Hull Tramways Committee have considered quotations and particulars obtained for the supply of electrical and petrol-driven motor tower wagons. The tramways engineer suggested that before arriving at a decision the vehicles at present in use by other tramway undertakings should be inspected, and the committee left the matter in the hands of the chairman and deputy chairman.

SOCIETY OF MOTOR MANUFACTURERS AND TRADERS.

Mr. E. Powell has been re-elected President of the Council of the above society for the ensuing year. The following gentlemen have been elected to the Council, the asterisk denoting members of the Management Committee:—

Vice-Presidents:—

*A. Brown, Brown Bros. *E. Hopwood, Wolseley Motors.

J. H. Adams	Belsize Motors.
*A. R. Atkey	Agents' Section.
R. D'Arcy Baker	Fiat Motors.
*S. D. Begbie	Aster Engineering Company (1913).
F. S. Bennett	F. S. Bennett, Limited, Cadillac Motors.
*L. M. Bergin	Dunlop Rubber Company.
W. Bond	St. Helens Cable and Rubber Company.
A. Brampton	Brampton Brothers.
F. Churchill	J. and E. Hall.
*D. Citroen	Minerva Motors.
B. Coathupe	Agents' Section.
A. Craig	Maudslay Motor Company.
R. Dennis	Dennis Bros. (1913).
S. F. Edge	Past President.
*A. Goodwin	C. A. Vandervell and Company.
E. W. Hatfield	Agents' Section.
G. F. Heath	Agents' Section
*H. M. Hobson	H. M. Hobson
W. M. Iliff	Sunbeam Motor Car Company
*E. M. C. Instone	Daimler Company
E. Manville	Past President.
H. Johnson	Joseph Lucas
*F. Lanchester	Lanchester Motor Company.
J. C. Lees	Chas. Macintosh and Company.
*W. M. Letts	Crossley Motors
C. Marston	John Marston.
*J. Maughling	John I. Thornycroft and Company.
F. May	Green Engine Company
*A. S. Mays-Smith	De Launay Belleville Automobiles (England).
*F. Maythorn	Maythorn and Son.
*A. N. Mobbs	Agents' Section.
S. Norris	Agents' Section.
P. L. D. Perry	Ford Motor Company (England).
*T. C. Pullinger	Arrol-Johnston.
J. J. Rawlings	Agents' Section.
J. Graham Reece	J. Blake and Company.
*F. W. Shorland	Clement Talbot.
H. White-Smith	British and Colonial Aeroplane Company.
*H. Smith	Rover Company.
S. Straker	Past President.
*H. C. B. Underdown	Commercial Cars.
H. T. Vane	D. Napier and Son.
L. Walton	Vauxhall Motors.
Rowland Winn	Agents' Section.
G. H. Woods	British Westinghouse Electric and Manufacturing Company.
T. H. Woollen	Palmer Tyre.
W. Peto	Peto and Radford.

WAR OFFICE AND THE L.G.O.C.

National Service of the Company.

In the House of Commons on May 30, on the order for the third reading of the Consolidated Fund (No. 3) Bill, Mr. Ashley (Blackpool), in calling attention to War Office administration, said that he had been taken to task for his statement about the London General Omnibus Company, but as far as his information went what he said was perfectly true. The proposal made by the company to the War Office at the beginning of the war was, he was told, refused by the Financial Department of the War Office, though it was backed by the Quartermaster-General's Department. The result was that the Government had paid from £600,000 to £750,000 where they might only have paid £170,000 or £200,000.

Mr. Forster (Financial Secretary) replied that Mr. Ashley's information was not altogether accurate. The question whether the London General Omnibus Company's business should be taken over by the Government as the railways had been was thoroughly considered, as was necessary, seeing that a cost of between £1,000,000 and £1,500,000 was contemplated by those who recommended that course. The Quartermaster-General, the then Financial Secretary, and other officials concerned unanimously recommended the arrangement which had been adopted.

We may add that the Government have an arrangement with the company for the use of their vehicles and drivers whenever they may be required by the military authorities in an emergency. The omnibuses have been used for the transport of Belgian refugees and in conveying aliens to the camps in the London district. On the occasion of the sudden decision to send a naval landing force to assist in the defence of Antwerp, the company at a few hours' notice supplied a large number of omnibuses, with drivers fully equipped, when invaluable service was rendered in transporting troops to that city and also during the withdrawal.

Digitized by Google

MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

TIRES FOR OMNIBUSES.—Sheffield Tramways Committee have placed a contract with the Dunlop Rubber Company for the supply of tires for motor omnibuses at 0·875d. per mile.

ELECTRIC VEHICLE COMMITTEE.—The Society of Motor Manufacturers and Traders, Limited, have appointed Mr. T. C. Pullinger, of Arrol Johnston, Limited, to represent this society upon the Electric Vehicle Committee.

GLASGOW CORPORATION GARAGE.—The municipal garage maintained by the tramways department for Glasgow Corporation contains twenty motor cars for the use of officials and committees. These are now all driven by women.

ELECTRIC DELIVERY DRAYS.—The Midland Railway Company is experimenting with electric drays for delivering goods in the outlying districts of Sheffield. Three accumulator vehicles are being used, and it is reported that they are giving complete satisfaction.

WORKING COST AT ROTHERHAM.—Owing to the increased charges for materials the working cost of the motor omnibus services of Rotherham tramways department has risen from 7·62d. to 8·92d. per mile. This amount includes sinking fund on the basis of a life of five years.

REVERSION TO HORSE TRACTION IN BERLIN.—In consequence of all the motor omnibuses of the Berlin Omnibus Company having been appropriated by the army, the company have reverted to horse traction. The traffic receipts have fallen from £665,000 in 1913 to £312,000 for 1915.

AN OFFER FOR OLDHAM OMNIBUSES.—A firm at Colwyn Bay offered to hire the omnibuses owned by Oldham Corporation for certain periods of the year. The offer has been refused by the Tramways Committee, and a member stated that if they sold the vehicles it would only be to secure more adaptable ones.

THE PETROL REBATE.—The Commissioners of Customs and Excise have allowed a rebate to Willesden Urban Council of the whole of the petrol tax in respect of spirit used in the Council's cars for conveying children to and from the special schools, and also of wounded soldiers from railway stations to hospitals. The saving will amount to about £60 a year.

CAR ALLOWANCES TO OFFICIALS.—The following scale of allowances to officials of the Nottinghamshire County Council using their own motor cars has been agreed to by the Council:—Sixpence per mile for cars with four or more seats; 4d. per mile for cars with two or three seats; privately owned motor cycles, 2d. per mile (with or without sidecar); the scale not necessarily to apply to present arrangements in use but in all new arrangements.

THE ZENITH CARBURETTER.—With petrol so scarce it is the patriotic duty of all motorists to take every means of conserving it, and therefore the claims of the Zenith carburetter to save from 25 to 50 per cent. are worthy of investigation. A booklet giving details of what has been accomplished on most of the known engines by Zeniths will be sent post free on application to the Zenith Carburetter Company, Limited, 40-42, Newman Street, London, W.

OXFORD OMNIBUS FITTER AND MILITARY SERVICE.—In an appeal by the military authorities at Oxfordshire Appeal Court against the exemption of a motor omnibus fitter employed by Oxford Tramways Company, it was asserted that the man only did the work of a mechanic, but Mr. A. A. Tyler, the manager, gave contrary evidence, and added that the vehicles which the man attended to were placed at the disposal of military hospitals free of cost. While dismissing the appeal the court shortened the period of exemption until November 2.

MOTOR TIRES IMPORTS NOT PROHIBITED.—In a preliminary official list, motor tires and tubes were given as being among the articles the import of which was to be prohibited in order to lessen the demand upon shipping facilities. In the House of Commons on May 9, the President of the Board of Trade stated that the Board had been unable to include motor tires in the list. There were certain arrangements made with the rubber importers in the United States which had led to the decision that this prohibition should be abandoned.

OPERATING COSTS OF MOTOR SWEEPERS.—Among the objects of interest inspected by the Institution of Municipal and County Engineers during their visit to Hull on May 13 were a Weeks' tar spraying apparatus mounted on a Sentinel steam wagon, Whittome's "Royal" sweeper and "Rapid" sweeper, and Green's motor sweepers. Mr. Bricknell, the city engineer, stated that the petrol sweepers cost about £2 2s. a day for everything, including depreciation, tires, and wear, which was considerably less than the working cost of a horse-drawn sweeper.

MOTOR VEHICLES FOR MUNICIPALITIES.

HULL CORPORATION have invited tenders for the provision of a motor ambulance.

SOUTH SHIELDS COUNCIL have arranged to purchase a Leyland motor fire engine, at £1,117.

WORKSOP COUNCIL have directed the surveyor to obtain prices for the supply of a petrol motor wagon.

SOUTH SHIELDS COUNCIL have ordered a motor fire engine from the Leyland Company, Preston, at £1,117.

SOUTHAMPTON TRAMWAYS COMMITTEE have placed an order for an Edison battery automatic tip-wagon, at £950.

HOLMFIRTH COUNCIL are considering the question of purchasing a motor wagon owing to the scarcity of team labour.

WALSALL GAS COMMITTEE have placed a contract with Messrs. Alley and Maclellan, Limited, for the supply of a 3-4 ton steam wagon, at £730.

BRADFORD CLEANSING COMMITTEE on May 9 authorised a subcommittee to purchase three motor chassis if they are satisfied that supplies of petrol will be obtainable.

PLYMOUTH CORPORATION have decided to purchase a 3-ton Edison lorry for the sum of £1,055 for the cartage of coal from the railway station to the electricity works, and for the use of other departments also.

THE LONDON WATER BOARD have consented to an increase of £25 in the contract price of a motor ambulance that Messrs. Dennis Brothers are constructing for them. The addition is to meet the increased cost of labour and materials.

HALIFAX HEALTH COMMITTEE are obtaining information as to the best class of vehicle to use for the collection of house refuse. Owing to the difficulty of obtaining horses, carts, and men the committee have already secured a Yorkshire Commercial steam wagon.

NOTTINGHAMSHIRE COUNTY COUNCIL have agreed to purchase a steam motor wagon from Messrs. Clayton and Shuttleworth, Limited, at £700, in order to carry out work that is being performed for the Government. The Road Board are advancing a loan, free of interest, repayable in five years.

SHEFFIELD TRAMWAYS COMMITTEE have agreed to purchase an additional Daimler omnibus chassis, at £790. The body will be supplied by the department's car shop. Owing to the increase in the number of omnibuses the Committee, at the request of Mr. A. R. Fearnley, the general manager, are considering the question of providing extra garage accommodation.

SALFORD COUNCIL have placed a contract with Thomas Green and Son, Limited, of Leeds, for a Green's motor sweeper, at £614 15s. If at the end of a month's trial the machine proves satisfactory, the Council propose to purchase a second one from the same firm. The Council have accepted the Albion Motor Car Company's tender, at £896, for the supply of an additional 4-ton petrol motor wagon.

HALIFAX TRAMWAYS COMMITTEE have purchased a 3-ton omnibus chassis from the Daimler Company. Three Daimler chassis belonging to the tramways department are being sold for £450 each to the British Automobile Traction Company, London. The borough treasurer has reported that the working of the omnibuses of the department for the year ended March 31 last resulted in a loss of £355, as against a profit of £215 for the preceding year.

MUNICIPAL AND COUNTY ENGINEERS.

Road matters will occupy a large share of the attention of the Institution of Municipal and County Engineers at their annual conference, which is to be held on June 29-30 and July 1 at Blackpool. The papers to be read and discussed will include the following:—"The Destruction of Roads," by Thomas Arnall, Birmingham Corporation. "Improvement of Highways to Meet Modern Conditions of Traffic," by W. H. Scholfield, county surveyor, County Palatine of Lancaster. "Road Signs," by C. H. Cooper, borough engineer and surveyor, Wimbledon. "Transport Reform," by A. E. Gattie, London. "Public Abbatoirs," by H. A. Brown, engineer and surveyor, Weston-super-Mare. "The Diesel Engine in Municipal Work," by F. Reginald Phipps, borough engineer and surveyor, Basingstoke. "Diagrammatic Statistics for Municipal Engineers," by Reg. Brown, engineer and surveyor, Southall-Norwood.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 30. | LONDON, SATURDAY, JUNE 10, 1916. | [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—in the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF HALIFAX.

STEELWORK.

The Electricity Committee of the Halifax Corporation invite Tenders for the Supply and Erection of Steelwork over the Dam at the Electricity Works.

Specifications may be seen and Forms of Tender obtained on application to Mr. James Lord, M.I.C.E., Borough Engineer, Town Hall, Halifax, upon payment of the sum of £1, which will be forfeited should the Contractor not send in a bona-fide Tender or afterwards withdraw his Tender.

Tenders, endorsed "Bridge, Electricity Works," must be sent to the undersigned not later than 10 a.m., Saturday, June 17, 1916. (An "A" certificate from the Ministry of Munitions has been obtained for the execution of the above work.)

The person whose Tender is accepted will be required to observe the Fair Contracts Clauses adopted by the Corporation.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
PERCY SAUNDERS,
Town Clerk.

Town Hall, Halifax,
June 2, 1916.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee invite Tenders for the following:—

1. Coal Elevator.
2. Vertical Steam Boiler Feed Pump.

Specifications and Forms of Tender may be obtained from the undersigned on payment of One Guinea for each Specification, which will be returned on receipt of a bona-fide Tender. Five shillings will be charged for extra copies of Specification.

Tenders, addressed to the "Chairman of the Electricity and Tramways Committee," Town Hall, Warrington, must be sealed with wax and endorsed "Tender for Coal Elevator" or "Boiler Feed Pump," as the case may be, and delivered not later than twelve o'clock noon, on Wednesday, June 28, 1916.

The lowest or any Tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

COUNTY BOROUGH OF SUNDERLAND.

TO CLOTHIERS AND OTHERS.

The Corporation are prepared to receive Tenders for supplying (a) the Uniforms, and (b) the Caps required for the inspectors, motormen, female conductors, and pointboys of the Borough Tramways. Particulars may be obtained on application to the Tramways General Manager, and pattern styles of uniform may be seen at the Tramways Office, Sunderland.

Tenders, in sealed envelopes, together with sample uniforms and caps, must be delivered at the Town Clerk's Office, Sunderland, before Thursday, June 29th inst., at 12 o'clock noon, the envelopes containing the Tenders to be endorsed "Tender for Tramway Uniforms and Caps," "Tender for Tramway Uniforms," "Tender for Tramway Caps," or "Tender for Tramway Uniforms for Female Conductors," as the case may be.

The Corporation do not bind themselves to accept the lowest or any Tender.

H. CRAVEN,
Town Clerk.

Town Hall, Sunderland,
June 6, 1916.

COUNTY BOROUGH OF WOLVERHAMPTON.

COAL AND ASH-HANDLING PLANT.

Tenders are invited for Supply of Coal and Ash-handling Plant at the Electricity Works, Commercial Road, Wolverhampton. Contractors are invited to submit schemes to comply with the requirements of the Engineer.

General Specification and Plan of Site will be sent on receipt of application, which must be accompanied by a deposit of £2 2s. 6d. This will be returned on receipt of a bona-fide Tender. Applications to the undersigned for Plans and Specification to be made by June 16, and Tenders to be delivered within fourteen days of receipt of Plans and Specification.

S. T. ALLEN,
Chief Engineer and General Manager.

POSITIONS VACANT.

TRAMWAY ASSISTANT.

Tramway Assistant wanted to take charge of car shed, for small system, 30 cars; Scotland. Applicants must fully state mechanical training, tramway experience, age, and salary required.—Box 425, Willings, 50, Copthall Avenue, E.C.

ERITH URBAN DISTRICT COUNCIL.

ELECTRICITY SUPPLY AND TRAMWAY DEPARTMENT.

Tramway authorities having tramcars for hire or disposal, in good working condition, and of standard gauge, are invited to communicate with the Engineer and Manager, Council Tramways, Erith.

BARNSLEY CORPORATION.

PARTICULARS OF SETS FOR SALE.

Two 75-kw. high-speed d.c. direct-coupled Generating Sets, used for lighting and traction work.

Engines (Willans & Robinson), 125 h.p. compound, fitted with automatic and hand-controlled expansion gear; working pressure 160 lb. per sq. in., r.p.m. 470.

Dynamos, four pole, shunt-wound, for 500 volts and 150 amperes, either for separate or self-excitation, by Johnson & Phillips (1900).

No. 1 engine is in working order; dynamo needs repairs to four field coils.

No. 2 engine and dynamo are in first-class working order, running alternately on lighting and traction at the present time.

The plant can be seen at the Barnsley Corporation Electricity Works, Barnsley.

Tenders to be addressed to the "Borough Electrical Engineer," and received not later than June 17, 1916, endorsed "Plant."

W. P. DONALD, Town Clerk.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire, and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission of Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000 000,000) tons of Coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street Piccadilly Manchester.

SAM FAY, General Manager.

Digitized by Google

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.

Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD,
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 8488 Leeds. MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

— (NATURAL, GLAZE, DULL FINISH, OR COLOURED) —
in twill, straight, or fancy weaves, canvas backed or unbacked, is

BRITISH MADE THROUGHOUT

from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd:
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JUNE 10, 1916.

WAR PROBLEMS AT THE CONFERENCES.

Owing to the war the conferences of the two tramway associations were last year shorn of the visits that give both enjoyment and instruction. There was no falling off in the usefulness of the papers and discussions, which at the municipal conference dealt entirely with problems arising from the war. Viewing those difficulties in the light of after events, the contentions put forward by the readers of papers have been justified. At the present time there are few tramways where women have not had to be employed as conductors and cleaners. During the year several of the large towns have gone ahead of Glasgow in the use of women as cleaners, but within the past month the Glasgow Committee have outstripped them all by ordering every man engaged in cleaning to seek employment in war industries needing further labour. By this time the number of women drivers in Glasgow is not far short of one hundred, and as there is only one other place—Ayr—where women have been similarly engaged on an extensive scale, it will not be surprising if at this year's Municipal conference the delegates are favoured with another paper from Mr. Dalrymple, giving an extended survey of labour problems with particular reference to women as drivers. Judging by the manner in which Military Tribunals are dealing with applications for the exemption of motormen, there is ground for fearing that more managers will find themselves forced to look to women to assist in keeping the services going. The only alternative is to secure aid from volunteer drivers, as Newcastle, Birmingham, and Bradford have successfully done. The joint effect of the operation of the Military Service Act (No. 2) and the reluctance of the Tribunals to give even conditional exemption, will doubtless contribute, in the matter of women drivers, towards making trade unionists among the employees realise, as those in other occupations have had to, that the nation's needs must stand first. In the second paper at the 1915 Municipal Conference, Mr. Alfred Baker, dealing with the position at Birmingham, made out a strong case in support of his Committee's action in raising fares in order to meet the increased charges due to the war. The extent to which this step has proved successful will be apparent from a glance at the financial statement in another column, but regard must be paid to the fact that fares had been unduly lowered two years before. It is instructive to note that while Birmingham has greatly increased its contribution to the rates, Manchester has had to suggest the reduction of the amount to be given next year. For the Tramways and Light Railways Association's meeting this month a programme of much usefulness has been arranged. It is a hopeful sign that one paper will be a plea for giving passengers greater comfort. To appreciate the need for this one has only to watch Londoners crowding into an omnibus when it stands side by side with a tramcar. Nor could there be a more useful subject for discussion than Mr. Blain's contribution on "The Safety Movement," in which the London General Omnibus Company have taken the lead among road traffic organisations in this country. There is no reason why some tramway operators should neglect to caution passengers upon the need for care in alighting and in passing behind a car. For years the L.C.C. cars have displayed painted warnings besides slips pasted to the doors of the upper saloon. This precaution, however, has not prevented the management from now taking the further step of affixing a printed notice on the panel below the grab rail.

OMNIBUS OPERATION AT BIRMINGHAM.

The accounts of Birmingham Corporation Tramways Department for the year ended March 31 last show that the earnings of the omnibus traffic were more than double those of the previous year. The total receipts were £48,159, as against £23,376. Of those sums the passenger receipts were £47,865 and £23,180 for each year, equal to an average of 12.244*d.* and 11.013*d.* per mile respectively. For 1915–16 the expenditure was £37,945, while for 1914–15 it was £18,826. The average operating cost per car mile was 9.706*d.* last year, and 8.944*d.* for the preceding year. The increase is due to the extra cost of materials and labour. The gross profit of £10,213 has been carried to profit and loss account. The number of passengers was 6,301,324, and the mileage was 859,688, including 78,538 miles by special omnibuses run for the convenience of persons engaged on Government work, the receipts from the latter vehicles being £4,786. Passengers employed on war work were also very numerous in localities beyond the tramway termini, and since March last the Tramways Committee have added eighteen 40-h.p. Daimler omnibuses to the previous stock of forty-one vehicles. The additions were necessary in order to cope with the demand for increased facilities on the three chief routes served, viz., Harborne Rednal, and Moseley. The routes are each from four to five miles, the first and second being extensions of tramway services, while the latter is a through service from the centre of the city. The omnibuses in use during the year were all Tilling-Stevens petrol-electric vehicles, the majority having been taken over from the Omnibus Company. Owing to the demands of the War Office and Admiralty, Messrs. Tilling-Stevens, Ltd., were unable to tender to supply the additions made since March last.

YORKSHIRE TRAMWAY MANAGERS' ASSOCIATION.

INSPECTION OF THE BRADFORD TROLLEY BATTERY VEHICLE.

A meeting of this association was held in Bradford on June 1, when the members present were Messrs C. J. Spencer (Bradford), J. B. Hamilton (Leeds), E. Cross (Rotherham), W. E. Nicoll (Barnsley), J. V. Moinet (Scarborough), R. H. Wilkinson (Huddersfield), W. McGibbon (Ossett), J. W. Hame (York), E. A. Paris (Dewsbury), H. L. White (Cleethorpes), J. W. Galloway (Halifax), J. D. Caird (Halifax), J. Parkinson (Dewsbury), C. J. Jewell (Wakefield), H. England (Wakefield). Luncheon was provided at the Great Northern Victoria Hotel, and afterwards the members adjourned to the Tramway Offices, when a discussion was opened by the chairman (Mr. C. J. Spencer), who gave a description of the new trolley battery vehicle, already referred to in this journal. An interesting discussion followed on the transit of goods in general, and the adaptability of this vehicle in particular for delivery of goods to places adjacent to tramway tracks. Among other questions discussed were trailer cars, women car drivers, and the liability of serious accidents through hand-brake handles slipping. The members then journeyed in a special car to Rawson Square, and there inspected the trolley battery vehicle. A hearty vote of thanks was accorded to Mr. Spencer for so kindly making such complete arrangements for the meeting, and the facilities he had given for a demonstration of the particular vehicle.

Digitized by Google

UNIVERSAL PENNY FARE FOR PLYMOUTH.

It has been decided by the Plymouth Tramways Committee to recommend again the adoption of a penny universal fare on any one car on all sections of the tramways. Mr. C. R. Everson, the general manager, in a report on the proposal, said: "The arguments in favour of the universal penny fares are: Simplicity for conductors in collecting fares, and for inspectors in checking them; less opportunity for pilfering; greater inducement for people to ride; better facilities for the riding public; less checking and clerical work in book-keeping in the office; no need for transfer tickets; no need for workmen's fares; and less cost of tickets and way-bills. During the year ended March 31 last the total number of passengers carried in the Plymouth area was 10,395,028, and workmen passengers 973,338, total 11,368,366. The average receipt per ordinary passenger was 1.03*d.*, average receipt per workman .50*d.* The total cost of carrying 11,368,366 passengers was £40,318 10*s.*, or an average cost per passenger of .851*d.* The average cost per workman passenger was .85*d.*, or a total of £3,451, and the average receipt per workman passenger .50*d.* or a total of £2,027, or a loss per annum of £1,423. With an average of 10,395,028 ordinary passengers at 1*d.*, the receipts would amount to £43,312, or a less amount, compared with the actual receipts, of £1,681. The additional number at 1*d.* required to make up this loss would be 403,504, or 1.09 passenger each single journey. There would be no need to carry any additional passengers if workmen were to pay a 1*d.* fare, as the receipts from that source would amount to £4,055, an increase of £2,027, compared with the actual receipts, thus more than counterbalancing the lesser receipts of £1,681 as previously shown. The number of single journeys per annum was 440,960, and the average number of passengers carried each single journey 25.73. In the Devonport area the passenger receipts for the six months from October 2 to March 31 last were £17,884, the total passengers being 406,051, and the average receipts per passenger being 1.056*d.* With an average of 406,051 passengers at 1*d.*, the receipts would amount to £16,921, or a loss compared with the actual receipts of £963. The additional number required to make up this loss would be 231,334, or 1.05 passenger each single journey. The number of single journeys for the six months was 218,400, and the average number of passengers each single journey 18.58. It would, therefore, be seen that if no additional passengers were carried on the whole of the tramways, the loss, based on last year's figures, would only amount to £617, provided workmen paid a penny fare."

L.C.C. TRAMWAY MATTERS.

At the London County Council's meeting on Tuesday, the Highways Committee reported that the Electrical Conciliation Board had considered the application of the shift-workers and other employees at Greenwich generating station for increased pay for overtime and for work on Christmas Day and Good Friday. The application had been granted in respect to the shift-workers, acting battery attendants, arc lamp trimmers, and certain other workers, who are to be paid at the rate of double time. The request of those employed in the power station not affected by previous agreements, had been adjourned *sine die*. The cost of giving effect to the agreement is estimated at £50 a year.

DOUBLING ON THE WOOLWICH ROUTE.

The Highways Committee recommended a further doubling of tramways in Woolwich, at an estimated cost of £2,750, in addition to the capital estimate of £4,500 in respect of the doubling of the tramways to Woolwich. The new expenditure would not be incurred unless and until the sanction of H.M. Treasury has been obtained thereto. A very heavy service of cars had to be run on the Woolwich lines, and the Highways Committee were of the opinion that the operation of the services would be materially facilitated if further doublings were carried out. The Finance Committee, having considered the proposal, submitted the estimated cost as chargeable to capital (twenty-five years) account.

BUSINESS DURING THE RECESS.

The chairman and vice-chairman of the Highways Committee were severally authorised during the Whitsuntide recess to open any tenders received in respect of services under the direction of that committee. The contract for the inspection and testing of weigh-bridges and weighing machines in the tramways department will expire on June 30, and the Highways Committee recommended that fresh tenders should be invited from selected firms. All of the foregoing reports were adopted. The Council adjourned until July 4.

APPLICATIONS TO THE TRIBUNALS.

At Smethwick Tribunal Mr. O. C. Power, in applying for exemptions for three employees of the Midland Joint Tramways Committee, said there was great difficulty in maintaining omnibus and tramway services. That morning nine omnibuses were held up at the garage with troubles. The mechanics put in a great deal of overtime, but it was impossible to keep all the vehicles on the road. In that department they were especially short of labour, and unfortunately they were hopelessly depleted in every section. All the motormen were working many extra hours. Conditional exemption was granted for two men, and a motorman was allowed three months.

Chatham and District Light Railways Company asked for the exemption of 35 married men, of whom 22 were motormen, in whom special skill was required owing to the hilly nature of the district. It was stated by Mr. W. Jensen, the manager, that of 50 cars in stock only 27 were running, with the addition of seven for workmen. Before the war there were 234 men and 17 boys employed, but 145 men and all those boys had left. Older men had been taken on, and the men now numbered 124, and boys 28, with 72 females who had replaced conductors. Conditional exemption was granted to the motormen, one engineer, and a repairer of mains, while two and three months were allowed in the cases of clerks, stokers, paviors, a night timekeeper, a night foreman, a chief motor inspector and two truck men.

MISCELLANEOUS NEWS AND NOTES.

Suggested Lancashire Extension.—A request has been made to the South Lancashire Electric Tramways Company to extend their lines to Astley.

Tramways for Persia.—It is reported from Petrograd that a Russo-Belgian company have received from the Persian Government a concession for the construction of tramways in the Teheran district.

Burton Corporation's Omnibus Powers.—A Provisional Order has been obtained by Burton Corporation removing the restrictions imposed by their Act of 1901 in respect to the running of motor omnibuses in connection with the tramways.

Neath Corporation to Acquire Tramways.—A decision has been arrived at by Neath Corporation to purchase the tramways undertaking of the Provincial Gas Traction Company, Ltd., at Skewen, Neath, and Briton Ferry. The lease has three years unexpired. Mr. M. Whittington is the manager.

Birmingham Trailer Experiments.—Councillor Harrison Barrow, chairman of the Tramways Committee, informed the City Council on June 6 that the recent experiment with trailer cars had proved unsuccessful, but the manager was proceeding with further experiments, which he hoped to be able to report favourably upon.

Traffic Pressure at Nottingham.—In reply to a suggestion that nurses should be allowed to travel at a reduced charge, Councillor R. H. Swain, chairman of Nottingham Tramways Committee, has replied that the reduced number of cars are carrying 885,000 passengers per week If any more were taken on a riot might result.

Track Repairs on the London United Tramways.—Ealing Council have been informed by the London United Tramways Company that, owing to the shortage of labour and material, they are unable to carry out extensive reparation of the track. The company will, however, do their best to keep it in the best state of repair under the circumstances.

Erith Omnibus Project Abandoned.—In consequence of the arrangements made with the Ministry of Munitions and the omnibus companies, Erith Urban Council have informed Woolwich Corporation that they have abandoned the application for a Provisional Order to enable their Tramways Department to run motor omnibuses.

Painted Car Windows.—As the Hull tramcars do not run after an air raid alarm has been given, the chairman of the Tramways Committee has been asked if the paint on the top windows of the cars could be removed, that course having been adopted at Grimsby. Councillor W. Wheatley replied that the committee were subservient to the military commander.

No Free Travelling at Birmingham.—The Corporation were asked on June 6, by Councillor Perry, to allow all soldiers in uniform to travel free on the tramcars. The motion was not seconded, and the chairman of the Tramways Committee stated that most tramway undertakings had given up that form of generosity because they found it was too expensive.

Plant and Rolling Stock Required at Delhi.—In their report for the past year the directors of the Delhi Tramways and Lighting Company state that owing to the increasing demand further generating plant must be provided as soon as funds are available, and new rolling stock is required. The cost of upkeep of cars and permanent way is still heavy, largely due to the increased cost of spares of all kinds.

Fares at West Ham.—The Tramways Committee recently again recommended the adoption of a list of shorter halfpenny stages, varying from about 800 to 1,000 yards. They also recommended that workmen's return tickets between the docks and Abbey Arms and Greengate Street be increased from 1*d.* to 1½*d.* At the request of the chairman of the Committee, the Corporation agreed to the report being taken back.

Women Conductors.—Tributes to the work of the women employed on the Mexborough and Swinton Company's cars were paid by Alderman Winter, the local director, and by Mr. P Priestly, the retiring manager, on the occasion of a presentation to the latter. Alderman Winter said they had proved themselves efficient and capable, while Mr. Priestly declared that they had "come to stay." He did not think there was anything but praise for them from the passengers.

Purchase of Devonport Tramways.—The Treasury having refused to sanction the issue by Plymouth Corporation of stock bonds or bills, of £111,706, for the purchase of the undertaking of Devonport Tramways Company, the Council will have to continue to pay interest at five per cent, probably until after the war. The Board of Trade have sanctioned the junction of the tramways at Peverell Park Road and Tavistock Road, and also the construction of a terminus at Catherine Street.

Income Tax on Tramway Rent.—Following the dismissal by the Commissioners of Taxes of Luton Corporation's appeal against their assessment to income tax in respect of rent received from the Tramways Company, the Council asked for an allowance in regard to depreciation. The company contended that they alone were entitled to such an allowance. Subsequently an arrangement was made whereby the Corporation will have the benefit of so much of the usual depreciation allowance as will release them from payment of income tax except to a small extent during the two last years of the existing lease.

Digitized by Google

Petrol Supplies to be Regulated.—A regulation has been made under the Defence of the Realm Act, to enforce a census of motor spirit supplies and the purposes for which and the manner in which it is used. The distributing organisations have undertaken to regulate the supply according to three classifications. Included in the second of these are motor omnibuses and railway companies. Motor omnibuses, chars-a-bancs, and cars running pleasure services are in the third classification. It is not anticipated that there need be any curtailment at present of reasonable demands in the first and second classes.

Reliability of Straker and Squire Vehicles.—On the purchase by Southwark Council of a motor gulley van from Straker and Squire, Limited, in 1913, the company agreed to maintain the vehicle for a period of five years for £90 per annum. The borough engineer reported on May 31 that it is unnecessary to continue the agreement for five years, and that the company were willing to cancel the contract two years from the date of execution, and to supply during the two years the necessary parts coming within the contract, provided the Council undertook the fitting. The authority have adopted that course.

Chesterfield's First Fatality.—Mr. R. L. Acland, general manager, Chesterfield Corporation Tramways, attended an inquiry into the death of a two year old child who was killed through running in front of a car. The lifeguard failed to act, and Mr. Acland said the only theories he could offer was either that the sudden application of the brakes caused the car to bump and the gate to pass over the child's body, or the child was not of sufficient weight to cause the gate to act, it requiring a force of 15 lbs. Both children and dogs had been picked up, and in one case a child jumped off the guard and ran off. This is the first fatality since the tramways were opened in December, 1904.

"Underground" Posters.—Owing to the paper shortage and in order to effect economies during the continuance of the war, the Underground Railways will discontinue the printing of pictorial posters for exhibition on their stations. This will mean that the many new and striking posters which adorned the stations will no longer be a familiar features of the "Tubes," and the spaces originally occupied by these bills will in many cases remain blank. For some time past, apart from the paper shortage, it has been increasingly difficult to spare staff to do the necessary posting, and for the future only essential notices relating to the working of the trains will be exhibited at the stations.

Shepherd's Block Parging.—Among the tramways now using Shepherd's block parging are the Councils of Salford, Rochdale, Rotherham, Colne, Sheffield, Maidstone, Wigan, Belfast, Bradford, Haslingden, Bolton, Milnrow, Heywood, Liverpool, Oldham, Ilkeston, Bexley Heath, Burnley, Preston, West Hartlepool, Eccles, East Ham, Nelson, Coventry, Chester, Blackburn, Rawtenstall, Portsmouth, Darwen, Doncaster, Gloucester, Scarborough, and Southport; Yorkshire Electric Tramways Company, South Lancashire Electric Tramway Company, St. Anne's and Lytham Tramways Company, Stalybridge, Hyde, Mossley and Dukinfield Tramways Board, Dunfermline and District Tramways Company and Midland Railway Company.

Non-Payment of Fares.—Several persons have been fined at Salford for neglecting to pay fares on the tramcars, the deputy town clerk stating that the offence had become very common. In one case an inspector found the defendant without a ticket, and instructed the conductor to give her cash-bag a rattle when the accused came downstairs. On reaching the platform the man turned his head in the opposite direction. In the ordinary collection of fares the rattling of the bag is a slipshod method, and it annoys honest passengers. The cry of "Fares, please," and direct approach to a person concerning when a conductor is in doubt, constitutes a much better way.

Restriction of Omnibus Routes.—The Local Government Board have issued a circular to local authorities in reference to their powers under the Local Government (Emergency Provisions) Act, 1916. A clause in the act renders it necessary for omnibus owners to obtain the consent of the highway authority in order to run on any route that has not been regularly used by their vehicles within two years preceding March 1, 1916. The Board observe that "the highway authorities will, no doubt, carefully consider in all its bearings any application for consent to establish a new route for omnibuses or similar passenger traffic, and, in exercising their powers under the section, pay due regard to the requirements of the travelling public as well as to the need for economy in road expenditure."

A Year's Experience of the Skip-Stop System.—Cleveland (Ohio) Railway report that during the year ended December 31, 1915, "a so-called skip-stop system was put into operation on substantially all the lines of the company. Its adoption has resulted in a very material decrease in operating cost per car-mile. The average speed of our cars in 1911 was 9.6 miles in the base-table hours, 9.6 miles in the rush hours, and 9.6 miles at night. In 1915 the average speed was 11 miles in the base-table hours, 10.2 miles in the rush hours, and 11.5 miles at night. This is an increase of nearly 15 per cent." In American cities it is customary to have stops at every street crossing, and on some routes these number twenty to the mile. Experience generally of the plan of reducing the number of stops shows that the convenience of the public is conserved thereby.

Sale of Ilkeston Tramways and Generating Station.—Ilkeston Council on June 6 decided by 14 votes to 4 to lease the tramways and electricity undertakings for 42 years to the Notts and Derbyshire Tramways Company, who intend to link them up with their tramways, etc. Since their opening in 1903 the tramways have resulted in an average annual loss of £2,500. the total being £32,498. The total length of route is 3.8 miles, and of track 4.3 miles. On the electricity works the loss has been £4,555, or an average of £350 a year. The capital charges outstanding on the tramways total £28,108, and on the electricity works £15,953. Considerable expenditure will be required for the renewal of the track. The Mayor (Alderman Macdonald) contended that with a population of only 30,000 the tramways would never pay the Corporation.

Third Party Risks at Leeds.—In his annual report to the Tramways Committee, Mr. J. B. Hamilton, general manager of the Tramways and commercial manager to Leeds Corporation, states that the result of the first year of the department's own handling of third party compensation risk has been satisfactory. The premium payable on the insurance basis would have been £5,263, while the cost of meeting all claims, plus a conservatively estimated amount for outstanding claims, was £2,634. In view of the difficulties under which the service has been carried on, such as reduced street and car lighting, and the loss of experienced motormen and conductors, this result is regarded as highly creditable to the staff. The lifeguard had operated forty-nine times and picked up, with little or no injury, pedestrians who had been knocked down in the street. There have been fatal accidents to three employees.

Increase of Fares at Gloucester.—The City Council have held a special meeting to consider the financial position of the tramways undertaking and a recommendation of the Light Railways Committee that there should be an increase of fares. On May 31 the Corporation decided to give two stages for a penny instead of three as at present, thus giving an average ride of just over a mile for this minimum charge. The alteration is not to apply to workmen's and school children's tickets. Transfer tickets are to be raised from a penny to threehalfpence. Councillor J. O. Roberts, chairman of the Committee, said the undertaking had received the equivalent of a 4*d.* rate each year during the past three years, and unless steps were taken to meet the increased charges during the war they would have to ask for anything from a 6*d.* to 8*d.* rate. The renewals fund totalled £1,750, and a contract had been placed for new points that would take all of that sum.

The Recent Strike at Croydon.—The services on the Croydon Corporation Tramways have now become normal. On June 5 the Council rejected by a large majority a proposal to instruct the manager to appoint to their old positions the employees on strike who offer to return to work. The same fate met a motion for the appointment of a committee to meet three employees to discuss alleged grievances. At the adjourned hearing on June 6 of nine summonses against Mr. T. B. Goodyer, the manager, for employing nine unlicensed persons on the cars, evidence was given that in eight cases the men had been formally tested and passed out by an inspector from the Public Carriage Office, Scotland Yard, two of the men having previously been motormen, holding licenses, which had been given up on their joining H.M. forces. In the ninth case, although the person concerned had not been formally passed out by the inspector, he had had sufficient training to justify the manager to permit him to act. The summonses were dismissed. There was a similar result to a summons against a motor inspector for failing to wear his badge while acting as a driver, the man having left it at home when changing a wet coat.

PERSONAL.

Mr. Shepherd, assistant engineer, Mexborough and Swinton Tramways Company, is serving with the British force at Salonika.

Alderman J. H. Corke, Mayor of Portsmouth, one of the King's birthday knights, was for some years chairman of the Tramways Committee.

Mr. R. Blackmore's salary as chief engineer to Stalybridge, Hyde, Mossley and Dukinfield Joint Tramways and Electricity Board is being considered by a sub-committee.

Mr. F. C. Harrison has been appointed a representative of the London County Council on the Permanent Way and Building Conciliation Board, in place of Mr. Cooper Rawson, who has resigned.

The Hon. Arthur Stanley, M.V.O., M.P., was one of fifteen civil recipients of C.B., Order of the Bath, on the occasion of the King's birthday. The honour is a well-merited recognition of Mr. Stanley's arduous labours on behalf of the Red Cross organisation.

Mr. A. H. Seabrook, electrical engineer and general manager, Marylebone Corporation electricity undertaking, having completed the duties upon which he has been engaged for the Metropolitan Munitions Committee, has been given leave of absence by the Council in order that he may take up a commission. He will serve in a department where his experience in munitions work will be utilised.

Mr. Robert Watson has resigned the post of manager of Musselburgh Electric Tramways Company, which he had held for three years. Prior to that he was for ten years secretary of the National Electric Construction Company, Ltd., and of its subsidiary companies, including the Musselburgh Company. The new manager at Musselburgh is Mr. E. J. Walsh, at present engineer of the local company, who will act as manager and engineer.

Mr. E. C. Geddes, deputy general manager, North-Eastern Railway, since 1910, was created a knight on the King's birthday. On the formation of the Ministry of Munitions he was appointed one of Mr. Lloyd George's principal assistants. He has served as claims agent, commercial agent, and chief goods manager of the N.E.R., which he joined in 1904. Previously he was employed for fourteen years on American and Indian railways, and he began life as a station porter. He has also worked in an American lumberyard.

Mr. Percy Priestley, on leaving Rawmarsh to take up the position of general manager, Oldham Corporation Tramways, has been presented with a solid silver tea service bearing the following inscription:—"Presented to Mr. P. Priestley, engineer and manager of Mexbro' and Swinton Tramways, by the employees, staff and a few friends, on his leaving to take up the position of general manager of Oldham Corporation Tramways." Alderman D. L.

Digitized by Google

Winter, J.P., the local director, presided, supported by Mr. W. Mitchell (commercial manager), Mr. M. McLeod (traffic superintendent), etc. The chairman said he became local director in 1908, a year after Mr. Priestley joined the company, and he could affirm that that gentleman had acted as a friend to everyone of them. During the war he had had to contend with the difficulties imposed by scores of the employees joining the forces. Since its inception the company had never had any troubles with the men, and Mr. Priestley was leaving with the goodwill of all who knew him. He asked him to accept the present as a token of great esteem and affection. Inspector Long, Councillor E. J. Twigg (Rotherham), and several employees also spoke. In reply, Mr. Priestley said if he could take his present staff to Oldham he would not have the slightest thing to fear.

CONTRACTS AND ORDERS.

Hadfields, Ltd., have received an order from Bradford Tramways Committee for 100 special steel wheels and tires with axles, at £19 11*s.* 6*d.* per set.

Jowett Motor Manufacturing Company have received an order from Bradford Corporation for two General Vehicle electric trucks for coal and ash conveyance at the electricity works.

Briggs, Jones, and Gibson, Ltd., Manchester, have received a contract from Salford Council for the supply of women tramway inspectors' and conductors' uniform clothing during the year ending March 31, 1917.

Walthamstow Council have placed the following contracts:—Paterson Engineering Company, Ltd., water-softening plant for the electricity works, £750; Cammel, Laird, and Co., eighteen tramcar axles, £5 16*s.* each; P. R. Jackson and Co., Ltd., twenty-four commutators, £5 10*s.* each.

Rochdale Council have awarded the appended contracts for extensions at the electricity works:—E. Green and Sons, Wakefield, economisers; Sturtevant, Ltd., London, induced-draught plant; R. and T. Howarth, Rochdale, chimney; Dempster and Sons, Elland, ash-handling plant.

Salford Council have ordered a permanent way wagon body from the United Electric Car Company, and have placed the following contracts:—British Westinghouse Co., Ltd., auxiliary steam turbine; G. and J. Weir, Ltd., two roto-feed pumps; William Gornall, erection of sub-station building and construction of machine foundations; British Westinghouse Co., Ltd., three phase e.h.t. switchboard; Stewarts and Lloyds, Ltd., mild steel pipes and separator; Stanton Ironworks Co., Ltd., cast iron pipes and valves. These contracts are in connection with a 5,000 kw. turbo-alternator to be supplied by Willans and Robinson, Ltd.

FINANCIAL REPORTS AND MEETINGS.

Brazilian Traction, Light, and Power Company.—The directors announce a quarterly dividend of 1½ per cent. on the preference shares.

Worcester Electric Traction Company.—Including £293 brought forward, net profits for 1915 were £4,042. A dividend of 3 per cent. is proposed, adding £1,000 to the reserve, and carrying forward £150.

Singapore Electric Tramways Company.—For the year 1915 the net profits were £3,883 after providing for debenture interest, and the surplus profit brought from the previous year increased to £6,033.

New General Traction Company.—The report for the year ended March 31, gives the net profits as £11,299, and £7,081 was brought forward. A dividend of 4 per cent. is proposed, carrying forward £7,900.

Shanghai Electric Construction Company.—The net profits for 1915 were £31,084, and £4,703 was brought forward. A dividend of 7 per cent. is proposed, adding £10,000 to the renewal fund, writing £2,000 off preliminary expenses, and carrying forward £1,387.

L.C.C. Tramway Receipts.—The traffic receipts for the week ended May 24 were £49,920, an increase of £37,310, as compared with the corresponding week last year, when the strike of the tramway employees was in progress. The number of passengers was 11,813,957, an increase of 8,936,908. From April 1 to May 24 (seven and a half weeks) the total receipts were £365,415, an increase of £46,678 on the corresponding period of 1915. The route mileage was 141.21.

United Electric Tramways of Monte Video.—The net revenue for the year ended March 31 was £120,220, and the sum receivable from La Sociedad Comercial de Monte Video in respect of revenue was £111,413. After providing for debenture interest, etc., £51,692 remained, while £12,973 was brought forward. Dividends amounting to six per cent. are proposed on the preference shares, appropriating £26,062 for redemption and contingencies, and carrying forward £13,103.

British Electric Traction Company.—The report for 1915 gives the gross profit as £244,064, compared with £235,508 for 1914-15. After deducting general expenses and the amount written off sundry assets, viz., £34,895, there remains £209,169, to which is to be added the amount brought forward, £71,398. Deducting debenture stock interest (£91,259) there remains £189,308, which the directors recommend should be applied as follows, viz., To reserve, £20,327; dividend of six per cent. for the year on the cumulative participating preference stock (on account of which £12,107 has been paid), £42,764; dividend of three per cent. for the year on the ordinary stock, £39,787; to be carried forward, £86,428. The reserve of £482,162, has been reduced by £93,230, the amount applied in paying up in full a like amount of shares for distribution among the holders of income certificates, in accordance with the scheme of arrangement. The reserve stands at £410,000. Having regard to the state of war, the consequent increase in the cost of material and wages, and the difficulty of obtaining labour, the directors consider that the improvement in the revenue is satisfactory.

Barrow Electricity Profits.—For the past year the revenue of Barrow Corporation electricity works increased from £26,585 to £59,208, the gross profits from £12,717 to £24,399, and the net profit from £3,163 to £12,804. The number of consumers increased from 1,625 to 2,348. The bulk of the supply was taken by Messrs. Vickers, Ltd. The local Tramways Company also obtain their supply from the Corporation.

Birmingham Corporation Tramways Record Receipts.—The result of the increased fares instituted last August is seen in the accounts of the Tramways Committee for the year ended March 31 last. The traffic receipts amounted to £765,036, which is a record, the previous highest being £640,091 in 1915. The total increase is £124,945, or 19.5 per cent. in excess of the previous highest. £2,480 of the increase is in respect of the Warwick Road tramway, which was opened in February. The passengers numbered 163 millions, as against 149 millions. The miles run were 14,151,000, as against 14,232,000. On the expenditure side the figures are again abnormally high, due to the increased cost of labour and materials, the total increase in the expenses being £60,000, or 12.7 per cent. in excess of the previous year's figures. After paying interest and sinking fund charges the surplus is £107,749, as against £47,596, of which £57,749 has been carried to reserve fund account, and the balance £50,000 is transferred in relief of the rates. The latter sum, which shows an increase of £20,000, is the largest amount received from any of the trading undertakings. During the year £53,543 has been charged against the reserve fund account in respect of reconstruction of permanent way. It has also been considered advisable to charge against this account the cost of the omnibus undertaking. The capital expenditure on the tramways during the year was £17,523.

Glasgow Corporation Tramways.—The financial year for all the Glasgow Corporation departments closed on May 31. The following are the traffic statistics for the tramways department:—

			Inc. or dec.
Average track mileage open during year (single)	196¼		
Car mileage . . .	24,963,309	+	748,849
Traffic receipts . . .	£1,149,264 7*s.* 6*d.*	+	£78,570 3*s.* 8*d.*
Traffic rcts. per car ml.	11.049*d.*	+	.437*d.*
Traffic rcts. per psgr. .	.761*d.*	—	.003*d.*
Passengers carried . .	362,371,464	+	26,110,706
Passengers per car mile	14.516	+	.629

The following statement gives the number of passengers carried at each fare:—

	Year to May 31, 1916.	Year to May 31, 1915.
½*d.*	232,871,360	213,165,819
1*d.*	93,768,671	89,890,042
1½*d.*	22,712,943	21,384,305
2*d.*	6,913,560	6,410,027
2½*d.*	3,075,567	2,834,795
3*d.*	1,453,771	1,285,605
3½*d.*	1,382,636	1,136,895
4*d.*	192,956	153,270
	362,371,464	336,260,758

Since July 1, 1894, when the Corporation assumed the management, the totals are as follow:—Passengers carried, 4,417,319,065; miles run, 361,006,250; car traffic revenue, £16,060,483 12*s.* 4*d.* Weight of copper received during the year to May 31, 1916, 735¾ tons; weight of silver, 1916, 93½ tons. The financial year ended and the new one began in a week in which the receipts exceeded all records for seven days. The total was £24,305, the previous record being £24,251 for the New Year holiday period.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of forty-five of the principal tramway undertakings in the United Kingdom, for the week ended May 27, give total receipts of £188,749, or £14,700 less than in the corresponding week of last year. The total length of track was 2,252 miles, or seventy more than for the corresponding week. The receipts this year were at the rate of £83 16*s.* 3*d.* per mile of single track, and last year at the rate of £93 4*s.* 9*d.*, thus showing a decrease for the week of £9 8*s.* 6*d.* per mile open. The adverse comparison is due to the fact that the week a year ago included Whit Monday. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. June 8.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	68½	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	70/7½	73/1½
4%	4%	Do. 4% Deb. ...	100	91	76	75½
4½%	4½%	Do. 4½% Deb. ...	100	98½	75½	75½
5%	5%	Do. 5% Deb. ...	100	96	77¾xd	77¼xd
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	18/3	18/3
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	95½	95½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	85	85
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$½	$1	Brazilian Trac. & Power Ord....	$100	66	63½	63¾
$1½	$1½	Do. 6% Cum. Pref.	$100	97	95½	96
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6¼xd	6¼xd
2/6	2/6	Do. 5% Cum. Pref.	5	5	89/-xd	89/-xd
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	91	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	38½	38½
6%	5%	Do. Pref. Ord....	100	106	40½	40½
5%	5%	Do. 5% Cum. Pref.	100	103	57¾	57¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	63	62½
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	75	75
70/-	70/-*	Do. 7% Pref.	100	55½	49	49
—	—	Do. 6% Pref. Ord.	100	17½	17 1/16	17 1/16
—	—	Do. Def. Ord.	100	11	10	10
5%	5%	Do. 5% Deb.	100	92	80	80
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	68½	67¾
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7¾	6 5/16	6¼
1/3	1/3	City of B.A. Trams.	5	5½	93/9	91/6
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	89	88¾
5/-	5/-	Dublin United Trys 6% Pref.	10	12	10½	10⅝
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	81xd	81xd
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	¾	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9 25/32	9/15/9
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	15/64	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	8/6	8/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	90½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	79½	78½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48½	48½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	101½	102
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	72½	72½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½	80½
$1½	$1½	Mexico Trams. Common ...	$100	70	27½	27½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	42	43
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94	94
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92½	92
1/2*	1/2¾*	National Steam Car	1	15/32	15/6	16/-
9⅜d.*	9⅜d.*	New General Traction	1	½	7/9	7/9
6d.	8⅜d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	61/3	61/3
5%	5%	Do. 5% 1st Deb.	100	89½	70	72
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	81	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	15/16	10/7½	10/7½
8d.	10d.	Provincial Trams. Ord.	1	¾	17/3	17/3
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	81	80½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	89½xd	89½xd
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	78½
—	—	Singapore Elec. Trams	5/-	½	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	93¾	93¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	91¾	91¾
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	74	73¾
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	June 3	£51,984	£50,805	23	£1,132,221	— £1,860
Auckland.....(28 days)	May 5	20,447	21,202	44	231,906	+ 4,308
Ballarat and Bendigo ...	Mar. 26	3,548	3,881	52	43,724	— 2,385
Brazilian Traction Mlrs.	Apr.	6,333,460	6,678,000	18	25,898,000	+1,475,940
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia.....$	Apr.	540,861	549,046	43	5,531,193	— 764,709
Buenos Aires Lacroze ...	May 11	44,480	41,503	48	454,605	— 11,116
Burmah Tramway ... Rs.	June 3	4,087	3,706	44	...	+ 6,811
Calcutta.....Rs.	„ 3	62,871	62,995	23	1,478,989	+ 83,706
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	May	1,931	2,927	22	12,857	+ 4,268
Cordoba	Mar.	12,746	13,598	52	161,906	+ 6,251
East India	May	2,119	2,161	43	20,867	+ 1,508
Hong Kong .....$	Apr. 29	10,199	17,252	20	221,278	+ 39,263
Kalgoorlie	Feb.	2,352	2,248	9	4,484	— 240
La Plata	May	4,489	4,343	22	22,189	+ 301
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon .....Escu.	Apr.	...	190,051	18	712,651	...
Madras (2 weeks).....Rs.	May 31	29,228	29,191	21	310,815	+ 24,500
Manila .....$	March	119,984	124,750	...	...	...
Manaos .....Rs.	March	...	157,156	...	...	...
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Montevideo	May	27,771	28,349	30	215,768	+ 13,342
Peruvian .....$	May	737,166	826,900	48	8,833,997	+1,233,666
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway.....$	*	...		...	...	...
Rangoon	May	4,887	4,589	22	24,376	— 372
Shanghai .....$	Apr. 26	23,284	25,305	...	...	...
Singapore .....$	Apr. 29	10,678	11,407	17	207,872	+ 24,685
Toronto.....$	Apr.	795,816	883,209	18	3,546,754	+ 319,541
Winnipeg	Apr.	264,856	282,498	18	1,169,808	— 63,597

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare	May 30	£362	£357	— 5	9	£3,240	+ £74
Aberdeen Corporation...	„ 31	1,369	2,088	+ 619	52	92,752	+ 6,153
Accrington Corp.	„ 24	728	613	— 115	8	4,566	+ 45
Ayr Corporation	June 3	336	356	+ 20	3	972	— 20
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 4	1,371	1,465	+ 94	9½	13,610	+ 816
Birmingham Corp.	„ 3	12,729	16,404	+ 3,675	9	149,432	+ 25,708
Do. Motor Omnibuses	„ 3	819	989	+ 170	9	8,402	+ 867
Blackburn Corp.	May 31	1,245	1,272	+ 27	9½	12,220	— 502
Blackpool & Fleetwood.	June 3	879	648	— 231	22	9,417	— 237
Blackpool Corp.	„ 1	2,277	1,338	— 939	9	11,719	+ 148
Bolton Corporation	„ 4	2,818	2,723	— 95	10	26,882	+ 1,896
Bournemouth Corp.	„ 7	2,004	1,945	— 59	10	21,486	— 56
Bradford Corporation	„ 3	6,400	6,515	+ 115	9	62,196	— 1,317
Brighton Corporation	„ 4	1,030	1,103	+ 73	9¾	10,421	+ 529
Bristol	„ 2	10,246	10,293	+ 47	22	207,761	+ 7,128
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	„ 3	1,565	1,694	+ 129	10	17,215	— 1,430
Burton-on-Trent Corp.	„ 4	281	266	— 15	9	2,373	— 351
Bury Corporation	„ 4	1,488	1,336	— 152	9¾	13,422	— 40
Cardiff Corporation	May 13	2,625	2,764	+ 139	6	16,668	+ 983
Chatham & District	June 1	1,183	1,294	+ 111	22	24,461	+ 1,178
Chesterfield Corp.	May 25	352	285	— 67	8	2,224	+ 67
Colne Corporation	„ 27	395	290	— 105	...	...	...
Cork Electric	June 1	536	550	+ 14	22	10,214	— 176
Croydon Corporation	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	June 3	1,017	1,108	+ 91	9½	10,324	+ 339
Dover Corporation	„ 3	300	325	+ 25	9	2,809	— 5
Dublin & Lucan	„ 3	187	179	— 8	22	2,685	— 366
Dublin United	„ 2	6,226	6,508	+ 282	22	118,858	— 9,451
Dundee City	May 31	1,350	1,445	+ 95	2¾	3,200	+ 192
East Ham Corporation	June 3	1,200	1,346	+ 146	9½	11,960	— 114
Exeter Corporation	„ 2	373	385	+ 12	9	3,371	— 110
Glasgow Corporation	„ 3	22,821	24,328	+ 1,508	3	11,508	+ 2,267
Glasgow Subway	„ 3	1,050	1,120	+ 69	22	26,817	+ 2,900
Glossop (U. Elec. Supp.)	„ 3	130	141	+ 11	23	3,049	+ 382
Halifax Corporation	May 30	2,060	2,202	+ 142	8½	19,324	— 796
Do. Motor Omnibuses	„ 30	46	49	+ 3	8½	392	— 69
Hastings & District	June 2	940	1,041	+ 101	22	18,325	+ 288
Huddersfield Corp.	„ 3	2,587	2,928	+ 341	9	26,543	+ 1,839
Hull Corporation	„ 3	3,001	3,106	+ 105	9	28,145	— 882
Ilford U.D.C.	„ 3	642	700	+ 58	9	6,367	+ 437
Ilkeston Corporation	„ 7	135	130	— 5	10	1,327	+ 54
Ipswich Corporation	„ 3	539	608	+ 69	9	4,618	+ 238
Isle of Thanet	„ 3	413	337	— 76	35	9,440	— 1,731
Kilmarnock Corp.	„ 3	169	161	+ 8	2¾	444	— 54
Lanarkshire	„ 1	1,945	2,336	+ 391	22	47,728	+ 7,873
Lancashire United	May 31	2,115	1,819	— 296	22	36,805	+ 1,400
Leeds City	June 3	8,808	9,651	+ 843	10	88,931	+ 7,145
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	„ 3	787	843	+ 56	2¾	2,347	+ 184
Leyton U.D.C.	„ 1	1,324	1,724	+ 400	9	14,669	— 11
Liverpool Corporation...	„ 3	13,562	14,296	+ 734	22½	298,883	+ 13,657
Llandudno & Colwyn B.	„ 6	392	323	— 69	26½	6,080	— 529
London County Council	May 24	12,610	49,920	+ 37,310	7½	365,415	+ 46,678
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	June 3	170	140	— 30	34½	4,510	— 1,325
Maidstone Corporation..	„ 1	196	206	+ 10	9	1,978	— 45
Manchester Corp.	„ 3	18,493	18,886	+ 393	9	170,695	+ 5,596
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	„ 3	174	220	+ 46	9½	2,031	+ 183
N'castle-on-Tyne Corp.	May 27	6,531	6,548	+ 17	8	50,579	+ 814
Newport (Mon.) Corp.	June 3	803	892	+ 89	9	8,317	+ 1,254
New St. Helens & Dist.	May 31	1,054	1,005	— 49	48	47,738	+ 2,836
Northampton Corp.	June 2	734	700	— 34	9	6,271	— 727
Nottingham Corp.	„ 1	3,495	3,852	+ 357	9	33,985	+ 901
Oldham Corporation	„ 4	2,428	2,302	— 126	10	25,334	+ 911
Portsmouth Corp.	„ 3	2,548	2,802	+ 254	...	...	...
Preston Corporation	May 31	888	1,069	+ 181	8¾	9,327	+ 756
Provincial	June 3	2,362	2,441	+ 139	35	74,656	+ 4,179
Reading Corporation	„ 1	733	837	+ 104	8¾	7,209	+ 387
Rhondda Tramways	May 18	1,123	1,228	+ 105	20	23,767	+ 1,354
Rochdale Corporation...	June 3	1,897	1,753	— 144	9½	16,720	— 20
Rotherham Corp.	„ 7	1,147	1,392	+ 245	9¾	13,591	+ 2,738
Salford Corporation	„ 5	5,205	5,311	+ 106	9¾	51,140	+ 1,679
Sheffield Corporation	„ 4	8,648	10,132	+ 1,484	10	102,914	+ 16,511
Southampton Corp.	May 31	1,414	1,638	+ 224	8¾	13,660	+ 685
Southend-on-Sea Corp.	„ 31	754	836	+ 82	9	6,803	— 773
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	„ 27	931	807	— 124	8½	6,431	+ 173
Sunderland Corp.	June 4	1,429	1,563	+ 134	9	14,341	+ 474
Sunderland District	May 31	528	611	+ 83	31	19,809	+ 885
Swindon Corporation	„ 31	197	204	+ 7	8¾	1,740	+ 39
Torquay Tramways	„ 25	759	609	— 150	21	9,907	— 78
Tyneside Trys. & Tmrds.	„ 31	610	624	+ 14	22	11,453	— 594
Wallasey Corporation	June 3	1,271	1,285	+ 14	9½	11,966	+ 113
Walsall Corporation	„ 3	692	800	+ 108	23	17,571	+ 2,095
Walthamstow U.D.C.	„ 3	893	1,152	+ 259	9	9,834	+ 1,573
Warrington Corp.	May 18	443	473	+ 30	7	3,335	+ 353
West Ham Corporation	June 1	2,837	3,403	+ 566	8¾	28,954	+ 1,453
Wigan Corporation	„ 1	1,492	1,617	+ 125	9	14,669	+ 601
Wolverhampton Corp.	„ 7	1,075	1,128	+ 53	10	11,700	+ 862
Yorkshire (W. Riding)...	„ 4	1,643	1,631	— 12	23	38,211	+ 2,983

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.)

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 31.] LONDON, SATURDAY, JUNE 17, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF SALFORD.

ELECTRICITY DEPARTMENT.

Tenders required by 12, noon, on June 26, 1916, for:—

Cable accessories.	Cement, lime, bricks, etc.
Demand indicators.	Motor carbon brushes.
Iron castings.	Iron and steel bars.
Nuts, bolts, screws and nails.	Tools and implements.
Brushes.	Files.
W.I. steam tubes and fittings.	Drysalteries.
Timber.	Wood fittings.
Engine-room stores.	Oils.

Window cleaning.

Specifications, forms of tender, and all information from Borough Electrical Engineer, Electricity Works, Frederick Road, Salford, to whom tenders must be delivered.

COUNTY BOROUGH OF ROTHERHAM.

The Rotherham Corporation invite tenders for their requirements during the ensuing twelve months of the following:—

1. Tramway Stores and materials, printing, stationery, oils, grease, tools, brake blocks, paints and varnishes, lamps, etc.
2. Smudge and pea nuts.
3. Single vulcanised bitumen cable, high-tension cable, rubber insulator cable, and trolley wire of various sizes.
4. Ampere hour meters of sizes and maximum currents of 2, 5, 10, 25, and 50 amperes, supply pressure 230 and 430 volts.
5. Motormen's oilskin coats and conductors' mackintosh coats.

Forms of specification, tender and particulars can be obtained on application to the Engineer and Manager, Electricity Works, Rotherham.

The persons or firms whose tenders are accepted will be required to enter into contracts which will contain the usual Fair Contracts Clause.

The tenders, properly endorsed, to be sent to me not later than July 3 next.

By order,
CHAS. L. DES FORGES,
Town Clerk.

Town Hall, Rotherham.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee invite Tenders for the following:—

1. Coal Elevator.
2. Vertical Steam Boiler Feed Pump.

Specifications and Forms of Tender may be obtained from the undersigned on payment of One Guinea for each Specification, which will be returned on receipt of a bona-fide Tender. Five shillings will be charged for extra copies of Specification.

Tenders, addressed to the "Chairman of the Electricity and Tramways Committee," Town Hall, Warrington, must be sealed with wax and endorsed "Tender for Coal Elevator" or "Boiler Feed Pump," as the case may be, and delivered not later than twelve o'clock noon, on Wednesday, June 28, 1916.

The lowest or any Tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

COUNTY BOROUGH OF SALFORD.

ELECTRICITY DEPARTMENT.

Tenders required by 12 noon on Monday, June 26, 1916, for coal conveyors and bunkers.

Particulars, etc., from the Borough Electrical Engineer, Electricity Works, Frederick Road, Salford.

POSITIONS VACANT.

SHIFT ENGINEER.

Wanted, Shift Engineer; experience in high-tension, three-phase and d.c.-supply; salary 38s. per week.—Apply stating age, experience, and enclosing copies of three testimonials, to William C. Bexon, Engineer and Manager, Electricity Works, Kilmarnock.

SWITCHBOARD ATTENDANT.

Switchboard Attendant required for tramway power station. Valuable experience to be gained with Diesel engines and battery. Must be ineligible for military service. State age, experience and wages required.—Burton and Ashby Light Railway, Swadlincote, near Burton-on-Trent.

DRAUGHTSMEN.

Wanted for factory near London, several first-class draughtsmen, thoroughly accustomed to the design of heavy motor road vehicles (petrol). Apply, stating age, experience and salary required, to nearest Labour Exchange, mentioning No. A 1971. Application from men at present employed on Government work will not be entertained.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire, and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission of Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of Coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

London & South-Western Railway Electrification

"THE TRAMWAY AND RAILWAY WORLD."

(*November* 13, 1915.)

Certainly the most exhaustive and well-illustrated description of this electrification scheme so far published. The description occupies twenty-eight pages and no fewer than sixty-one illustrations and diagrams aid the text. A detailed description is given of the plant and equipment of the power station, while the rolling stock and main line work are exhaustively dealt with. Speed and power consumption tests are also referred to.—*Electrical Industries.*

Digitized by Google

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.

Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." OVERHEAD LINE
Telephone: 3488 Leeds. MATERIAL AND SUPPLIES.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JUNE 17, 1916.

PETROL AND ELECTRIC VEHICLES.

The Order by the Board of Trade issued on Tuesday for what is called a petrol census raises in acute form the question of petrol *versus* electric traction for the road transport of goods in and near large towns. Every person who uses or keeps motor spirit is required to furnish a return as to his consumption, stock and estimated requirements. Five forms of return are provided, so as to distinguish between private motor-cars, medical practitioners' cars, hackney carriages, commercial motor-cars, and the use of petrol for other purposes than traction. After all the information has been obtained, the Petrol Control Committee will take further action to deal with the distribution and limitation of supplies. Of course, motor vehicles used for the needs of the Army and Navy will have the preference, and no doubt all kinds of commercial vehicles, including omnibuses not running on merely pleasure routes, will receive the supplies they need before anything goes to the use of pleasure cars. It is quite evident that the total supplies are regarded as inadequate; hence the Government action. Petrol already stands at a very high price, and it will not be surprising if the cost goes considerably higher. The users of commercial vehicles may not even be able to get as much as they want, especially for development of existing businesses. It accordingly behoves them to turn fresh attention to the electric battery vehicle, whose suitability for heavy work in transporting goods in and near towns has already been well proved. Such vehicles are already in use to a limited extent in London and other centres, and recently we referred to a development whereby a lorry is run by current from the overhead tramway wires where these are available, and by energy from a storage battery where tramway routes cannot be followed. There is no reason why this method should not be developed. Traders could take the energy through meters on the wagons, and even at present prices of coal they would be able to get the power cheaply, as a new load would be given to large power stations. Local authorities which own and work tramways would find great advantage in the use of such wagons for their own purposes, or of vehicles dependent on battery power alone, because they would be able to get the power at practically cost price. These facts are becoming recognised. Two recent instances mentioned in this issue are Bradford Corporation electricity department and Loughborough Town Council. The former has ordered two five-ton electric vehicles for carrying coal from a railway siding to the electricity works, and the latter proposes to order a two-ton wagon for the same purpose. These are pointers, following on many others chronicled in these columns within the past few months. Even apart from the cost of petrol, the electric vehicle has demonstrated decided advantages for many purposes, for it is easy to control and needs little repair. The old difficulty of the cost of battery maintenance has been largely got over, and altogether the time seems opportune for advance in the direction indicated. The difficulty, of course, remains of getting, in these war times, prompt delivery of vehicles ordered, but this can be no more, and is probably less, marked in the case of electric than of petrol vehicles.

PETROL CENSUS.

By an Order of the Board of Trade made in pursuance of Regulation 15a of the Defence of the Realm (Consolidation) Regulations, 1914, every person who uses or keeps motor spirit is required to furnish a return as to his consumption, stock and estimated requirements of motor spirit.

This return must be made upon a prescribed form and forwarded on or before 20th instant to the Secretary of the Petrol Control Committee at the Census of Production Office, 68, Victoria Street, S.W. Five forms of return have been provided for the several classes of users, namely:—

1. For owners of private motor-cars or motor-cycles, other than medical practitioners.
2. For medical practitioners.
3. For owners of hackney carriages.
4. For owners of commercial motor cars and motor-cycles.
5. For persons using or keeping motor spirit otherwise than for the purpose of supplying motive power to motor vehicles.

These forms, together with addressed envelopes, can be obtained (without payment) at any money order office in the United Kingdom.

Any person liable to make a return who does not duly make such return, or knowingly gives false information in such return, will be guilty of a summary offence against the Defence of the Realm Regulations.

APPLICATIONS TO THE TRIBUNALS.

Blackpool, St. Anne's and Lytham Tramways Company have been granted conditional exemption for their chief electrician.

Mr. T. G. Clabburn, general manager, Peterborough Electric Traction Company, has been granted six months' exemption from military service, by the Peterborough Tribunal.

Mr. J. W. Hame, on behalf of the York Corporation Tramways Committee, applied for the total exemption of three engine-room labourers, one boiler-house labourer, and one clinker wheeler. It was announced that it had been mutually agreed that two of the claims should be refused, that two men should be exempted to August 6, and one until September 6.

The Torquay Tramways Company asked for the exemption of six employees, viz., two inspectors, one permanent way foreman, two drivers, and one mechanical fitter. The manager, Mr. H. J. Nesbitt, said that he had only one fitter left. The permanent way foreman, one driver, and one inspector, were granted conditional exemption, and the others exemption until September 1.

Mr. C. J. Spencer, manager of the Bradford tramways, appealed against the decision of the Bradford Tribunal in the case of an engineering fitter, who, he submitted, was in a certified occupation. He (Mr. Spencer) had appealed for all skilled men engaged on repair work, and this was the only case which the local tribunal had refused. The men were not badged, but in correspondence the Minister of Munitions had stated that the tramways undertaking had sufficient protection under the certified occupations list. Mr. Spencer expressed the opinion that as a skilled engineer the man now appealed for could serve his country better in munition work than by fighting, even if it were held that he was not necessary for the Bradford tramways.

The local tribunal at Nottingham have recently dealt with claims put forward by the tramways department for 121 motormen, all of whom are married. The tribunal granted 21 motormen one month's exemption, 94 motormen three months, and the remaining six, four months. In view of the great difficulty in obtaining suitable drivers, the department fears that if the 21 motormen are taken, the number of cars will have to be correspondingly reduced. No fewer than 238 men have been released for the Army and for munitions, and another 97 have left the Corporation outright. The places of the conductors have been taken by 120 women, and the manager stated in a recent report that they are giving satisfaction.

Digitized by Google

RECENT PUBLICATIONS.

ELECTRIC RAILWAY HANDBOOK.

This exceedingly useful handbook has been compiled by Mr. Albert S. Richey, who is a well-known writer in the American technical press. His work consists of 800 pages (7 in. by 4 in. by 1 in.), and it has been presented in an attractive and convenient form. Its size is suitable for the pocket, and thin pages and flexible leather binding makes it agreeable to handle. Its interest is enhanced by two hundred illustrations, which help to elucidate the text. The volume fully realises the intention of the author that it should form a reference book of data, formula, and tables required by operating engineers and students, and at the same time be of service to the non-technical manager. A copious index largely contributes to this purpose, and at 7*s*. the book is a marvel of cheapness. Mr. Richey's career fits him to grasp the needs of those classes, for he has been connected with practical electric railway work since 1894. In 1905 he became professor of electric railway engineering at Worcester Polytechnic Institute, and since that date he has been constantly engaged in consulting practice with electric railways in New England, New York, New Jersey, Pennsylvania, and Indiana. Mr. Richey has made no attempt to produce a text book, but has compiled a compact pocket companion giving the information for which heretofore the engineer has been forced to search at the cost of much time and trouble. The book is published by the McGraw-Hill Book Company, of New York and London.

STEAM TURBINES AND GENERATORS.

The British Thomson-Houston Company has issued a beautifully-illustrated book descriptive of various types of Curtis steam turbines and electric generators driven by them. The illustrations include both reproductions from photographs and drawings. Some of the latter are diagrammatic, so that the construction and action can be more readily understood. The letterpress explains the principle of working of the impulse turbine, and then proceeds to describe the various types as made by the company under the Curtis patents. The diagrams are full and illuminating. Similar justice is done to the generators designed to be driven by the turbines. Among the advantages claimed for the latter are large clearances, buckets few in number and of great mechanical strength, most efficient method of governing by opening nozzles in succession, extremely small leakage, absence of balancing pistons, long previous warming unnecessary, smallest space for a given output, and easy accessibility to all parts.

COPPER-CLAD WIRE.

We have received from Messrs. Edward Le Bas and Co., Billiter Street, E.C., a copy of a new pamphlet issued by the Standard Underground Cable Company, Pittsburgh, U.S.A., descriptive of what is called standard colonial copper-clad wire. This is a steel wire covered and protected throughout its length by a welded coating of copper. The product can be drawn down to the smallest sizes. It is intended to meet the demand for a wire in which strength and durability are of greater importance than conductivity. The latter is from 30 to 40 per cent. of the conductivity of copper. Thus the merits are good conductivity, lightness, high elasticity, great strength, and non-oxydising quality. For many purposes this wire should prove very suitable. The pamphlet contains elaborate comparisons with the respective qualities of copper, iron, and steel wires. Messrs. Le Bas are the agents in this country for the Standard Underground Cable Company.

REPORTS RECEIVED.

City of Nottingham. Annual report of the Tramways Committee for the year ended March 31, 1916 (Chairman, R. H. Swain; general manager, J. Aldworth).

Colchester Corporation Tramways. Statement of Income and Expenditure and Report of the General Manager (R. C. Bullough) for the year ended March 31, 1916; with accounts and balance sheet (F. G. Mills, borough accountant).

City of Lincoln Corporation. The accounts of the electricity and tramways undertakings with reports thereon for the year ended March 31, 1916 (Stanley Clegg, city electrical engineer and tramways manager; J. H. Burgess, city accountant).

A SOLDIER TRAMWAY MAN ON WARTIME STRIKES

A Croydon man, who took no part in the recent strike, has received a letter from his brother, a conductor, now at the front, which we wish could be read by tramway men everywhere. Referring to the strikers, the writer of the letter says: "I think it disgraceful of them, and if you heard the remarks about them in our company alone it would do them good. I have met a lot of Croydon chaps lately, and they are all of the same opinion. They say they all ought to be shot, and if they were out here and did such a thing they would be. Just imagine the men in the Navy or the men in the trenches striking! Why, they would be shot at once; and we are not getting a war bonus to stop at home. By what I can see of it, it is the new hands that are the trouble—men who have no claim whatever on the Corporation. Just think how the Corporation have treated us chaps that joined in 1914—with half pay—that ought to have shamed them, I should think. You can give my respects to Mr. Goodyer and tell him I should be ashamed to come back and work alongside of such men. It is all very well for men to stick together for their betterment, but to make such demands when the country is in such a crisis as this—well, it is beyond forgiveness."

Croydon Council is to renew the track from Selhurst New Road to Selhurst railway bridge loop, and to construct a double line in extension of the existing line. The estimated cost is £2,156.

MISCELLANEOUS NEWS AND NOTES.

A Tramway Scheme is proposed to link up Aldershot, Farnham, and Farnborough.

North London Railway Electrification.—The conversion of this line, between Richmond and Broad Street, to electric working has advanced sufficiently to enable trial runs to be made.

The Tramcar as an Aid to the Bench.—Mr. Justice Avory informed a King's Bench jury that he sometimes rode in a tramcar because he thought it was the duty of a judge to keep himself acquainted with all phases of human life and affairs.

Later Car Services at Newcastle.—The Newcastle tramways management on June 11 extended the services of cars on all routes by about one hour, and it is expected that the arrangement will continue in force during the summer.

Manchester Tramcar Collections.—The current poster affixed to the tramcars at Manchester in connection with the collecting-boxes for war funds reads as appended:—"In this war all are willing—some to help—others to let them."

Luton Tramways.—The Board of Trade Order dated May 6th, 1916, extending the period from August 11, 1916, to August 11, 1918, for completing the tramways authorised by Luton Corporation Tramways Order, 1905, has been received by the Town Council.

Neath Tramways.—The decision of the Neath Town Council to take over the tramways from Skewen to Briton Ferry from the Provincial Traction Company, Ltd., is unlikely to be put into effect until after the war. The line will then probably be electrified and extended.

Wages at Nottingham.—The Nottingham Tramways Committee has granted an advance of ½*d*. an hour to motormen, conductors, and car cleaners. A war "bonus" of 2*s*. is still to be paid to those who are entitled to it on the basis of a 54-hour week. A war bonus to women has been refused.

Automatic Trolley Changers.—Several automatic trolley changers are being tried at Sheffield as a relief for women conductors. The changers work well as they have done wherever installed, and they should be more generally used. On dark and stormy nights they are a great boon to conductors of either sex, and they save much time.

Licences for Employees at the Front.—The licences of 65 Cardiff tramway drivers and 110 conductors who are serving with the forces have been renewed by the Tramways Committee. This has been done in order that the continuity of the record of the men should not be broken. New licences have been granted to 36 women conductors.

South Western Electrification.—The electrical equipment of the Hampton Court branch of the London and South Western Railway has now been completed, and electric trains will begin running in a few days. A fully illustrated description of the electrification of the suburban lines of the South Western Railway was included in our issue of November 18, 1915.

Blackburn Tramways.—The Blackburn Tramways Committee this week inspected the tramway system, car sheds, etc. Everything was found in a satisfactory condition, with the exception of a few lengths of rails which, in normal times, would require renewing. The price of rails is, however, so high at the present time and labour so scarce that renewals have been postponed.

An Excellent Example.—The Oxcroft Colliery Company, Ltd., have recently placed a contract upon the distinct understanding that the company to whom it is sent is not in any way under the influence or control, directly or indirectly, of any German, whether naturalised or otherwise, and that none of the payments arising from the execution of the contract will pass into the hands of Germans as shareholders or otherwise.

Edinburgh Defers Appointment of Municipal Manager.—The Tramways Committee of the Edinburgh Town Council have decided to defer the appointment of a tramway manager and also of a tramway engineer. The proposal is to lie on the table "until a more convenient season." Inasmuch as the lease of the Edinburgh and District Tramways Company does not expire until July, 1919, it was thought premature to make permanent appointments at present.

The Channel Electric Railway Scheme.—Sir Lionel Earle, secretary of the Office of Works, giving evidence before the Committee which is considering the South-Eastern Railway Bill for strengthening Charing Cross bridge, advised the Committee to contemplate the removal of Charing Cross Station to the south side of the Thames, and added:—"After the war there will be an enormous increase in traffic on this railway, with the probability in the near future of a Channel tunnel."

Special Cars for the Wounded.—Councillor J. Timpson recently called a special meeting of the Portsmouth Tramway Committee to consider applications which they had received for cars to convey wounded soldiers to entertainments. The Committee had hitherto adhered to their original rule that all special cars must be paid for on the regular scale, whatever the purpose for which they may be required; but they decided to charge in future only half the ordinary rates for special cars required solely for the convenience of wounded soldiers to and from entertainments specially provided for them.

Women Conductors at Leeds.—It was stated at a recent meeting of the Leeds Town Council that the conditions under which women work as conductors were so attractive that there was a waiting list of 1,250 women ready to accept positions under the Corporation. Alderman Wilson said that the conditions offered were relatively good. Most of the women had never earned so much before, and it was only through the professional agitators that they were worrying the council for more money. He did not agree that the women should receive the same wages as the men, especially as the council were paying the wages of the men that were gone.

Digitized by Google

Appeal for All-Night Cars.—The Springburn ward committee have applied for a half-hourly service of cars during the night on the main routes of Glasgow Corporation tramways, and the Tramways Committee have asked the general manager to prepare a report on the proposal. The Tramways Committee decided some time ago in favour of all-night cars, but the service was postponed on account of the war. It is now admitted that the need for an all-night car service is greater than ever before; but cars and labour are scarcer than they have been at any time during the war; it is difficult to see how the department can avoid postponement until after the war.

Cardiff Tramwaymen Sue the Corporation.—Writs in High Court actions have been served on the Cardiff Corporation by six members of the Tramwaymen's Union in respect of the refusal of the city council to make up their wages from the time they left the employ of the tramways department to join his Majesty's forces. The point involved is the legality of the contention of the tramways committee that these six men did not obtain the permission of the head of their department to join the Army, which was necessary, after a certain date, before they could participate in the council's resolution to make up the wages of all employees serving with the colours. The men are contesting the legality of the refusal in their cases.

The Rail Market.—Conditions in the market for steel rails have changed very little within the past few weeks. British works have few inquiries either from foreign, colonial, or home railways, and practically nothing is being done in tramway rails. Owing to the congestion everywhere existing in the United Kingdom it would, in fact, be impossible to place much business. The American trade is booming and inquiries are said to be very numerous even for far forward deliveries. Sooner or later there will have to be very large buying for necessary replacement of material, and the conditions as to time and delivery then likely to exist should be kept in mind. The policy of delay must have its limits, and it is questionable whether it is not being pressed farther in some cases than is necessary.

Coal Vans for Bradford.—The two electric vehicles which, as reported last week, have been ordered by the Bradford Electricity Committee from the Jowett Motor Manufacturing Company, of Bradford, for the conveyance of coal, will have chassis of the General Electric Vehicle Company's manufacture. Each vehicle will have a capacity of five tons, and will be fitted with electrically-operated tipping gear, one wagon being equipped with Edison cells and the other with an ironclad exide battery. The power station is situated only about 500 yards from the railway siding where the coal is received, and it is estimated that each wagon will be able to handle 100 tons of coal daily. It is expected that the wagons will be able to do the day's work on a single charge, and in this case it is estimated that there will be a saving of £500 per annum as compared with horse traction.

Nottingham Tramways' National Service.—In his annual report, Mr. John Aldworth, general manager, states that considerable difficulty has been experienced in maintaining the usual services owing to the depletion of the staff. No less than 228 men have joined the colours, and sixty-two have left the service for munition work since the commencement of the war. The shortage of drivers has been met as far as possible by training all suitable conductors, and replacing the latter with women. There are now over one hundred women in the service. Notwithstanding the large number of new employees and the darkened streets, the number of accidents has not shown any material increase. Throughout the year members of His Majesty's forces in uniform, and members of the Citizens' Army were carried at one half ordinary fares, and 33,360 prepaid tickets were issued for the free use of wounded soldiers and Belgian children.

London Electricity and Coal Supply.—At a conference held on Friday of last week of Metropolitan municipal authorities owning electricity undertakings, a resolution was adopted declaring that they were prepared to carry out a request made by the Board of Trade with regard to the supply of coal, and to do everything in their power within the local areas to attain the Board's object. The Board, in view of the possibility of a serious shortage of coal in the near future, had called attention to the considerable saving which could be effected by the adoption of arrangements for interconnection and joint working of electric supply undertakings, including interconnection with stations supplying tramways and railways. The Board were aware, they stated, of the difficulties involved, particularly in regard to labour and materials, but they urged on the supply undertakers the necessity in the national interest of taking immediate steps to avail themselves of the powers which existed for the purpose.

Edinburgh Tramways.—At a meeting of the Town Council on Tuesday Mr. Harrison, Convener of the Tramways, in reply to a criticism of the tramway service, pointed out that all vehicles running in the streets were not under the purview of the Tramways Committee, but of the magistrates. He knew that the magistrates had had the cars overhauled individually and that they had taken means to have every car brought up to a proper condition. The Tramways Committee would have under consideration a new timetable, and they would then again be able to check the number of cars. The number of passengers allowed to stand was fixed by the bye-laws. The Tramways Committee reported that orders under the tramway lease had now been served on the Tramway Company and Messrs. Dick, Kerr and Company for the renewal and repair of 33½ miles of tramway track, for the repair and overhaul of Shrubhill and Henderson Row power stations and for the renewal and repair of the whole pulley ways of the system.

Acquittal of Dudley Tramway Conductor.—T. Parker, the tramway conductor who was indicted for the manslaughter of Jonathan Thomas Evans at Dudley on January 16 as a result of the accident at Dudley has been acquitted. It was alleged that the accused released the brake of the car when the driver was away, and thus allowed the car to run down an incline for a distance of 450 yards, where it reached a loop-line and overturned. About thirty passengers were on the car, and one of these received fatal injuries. It is a rule of the tramway company that a conductor shall not release the brake until he receives an answering bell signal from the driver, but on this occasion Parker sounded the foot-gong, and, hearing another gong sound, he assumed that it was from his driver, whereas it was the gong on another car. When the runaway car had travelled some distance a woman called Parker's attention to the fact that there was no driver on board. He thereupon tried to put on the brake, but could not do so before the car overturned. The jury found that Parker was not guilty of criminal negligence.

Accident at Leeds.—A serious accident occurred early on Tuesday morning in Oldfield Lane, Wortley, Leeds. A goods car used for carrying clay got out of control at Wortley and ran down a hill for nearly a mile and crashed into a passenger car. Just before the accident the driver had taken the goods car to the Leeds Fireclay Company's works and discharged a load. While he was reversing the trolley pole preparatory to making the return journey, the brakes became released and the car began to run down the hill. The driver made an attempt to mount the platform, but was thrown to the ground. The track is a single one laid across several fields to Oldfield Lane, to which there is a sharp descent. The trolley pole left the overhead wire and swung loose. There was nothing to check the car until it dashed into the passenger car, which was running from Lower Wortley to the Corn Exchange in the same direction as the runaway car. The passenger car was hurled halfway round and partly through a stone wall at the side of the road. The passenger car was badly damaged, both platforms being completely wrecked. The goods car was not seriously damaged; it jumped the rails, but remained on the road. There were only a few passengers in the regular car, but they and the drivers of the two cars all sustained some injuries. The conductor of the passenger car was very seriously injured.

PERSONAL.

Mr. E. J. Walsh has been appointed manager of the Musselburgh and District Electric Light and Traction Company, Ltd., in succession to Mr. R. Watson, who has resigned.

Mr. S. E. Fedden, general manager of the Sheffield electricity undertaking, on the recommendation of the Electricity Supply Committee, will be granted a bonus of £100.

Lance-Corporal H. Williams, of the 7th King's Own Lancaster Regiment, who was a conductor on the Salford Corporation tramways, has been awarded the new military medal for bravery in the field. Corporal Williams saw service in South Africa during the Boer War.

Professor J. H. Dobson, general manager of the electric supply, tramways and gas departments of Johannesburg Corporation, has been appointed major in command of two Pioneer Companies for service in East Africa. The corps will comprise men who are familiar with the use of explosives.

Mr. H. E. Ellis, borough electrical engineer of South Shields, has been refused permission by the Electricity Committee to join His Majesty's Forces. While appreciating very highly the patriotic action of Mr. Ellis, the Committee regrets that in view of the responsible position which he holds, it is unable to give him leave of absence.

Sergeant J. W. Smith, 1-5th Royal Scots, has been awarded the Military Medal. He was mentioned in Sir Ian Hamilton's despatches for having extinguished a fire caused by the enemy which had broken out in a stack of ammunition, thereby preventing a serious explosion. Sergeant Smith was before the war a driver with the Edinburgh and District Tramways Company.

Mr. David James, general manager, Swansea Improvements and Tramways Company, and the whole of the staff and employees, received the thanks of Mr. C. G. Tegetmeier, chairman of the company at the annual meeting. The chairman remarked that the difficulties in carrying on the business with a very much depleted staff had been considerable and had involved very much increased work which had been cheerfully given by those who had had to remain.

Mr. W. J. McCombe, one of the selected candidates for the position of general manager of Belfast Tramways, who is at present manager of Hull Corporation tramways, is a native of Belfast, a city which, like Hull, is a famous port. The "Irish News" remarks that the experience gained in a port that compares in many respects with Belfast, which is also a considerable manufacturing centre, will probably be urged in Mr. McCombe's favour when the issue comes to be decided.

Mr. F. A. McCarty has been appointed general manager and engineer to Melbourne Tramways Board, which will take over the undertakings of the Tramways Company on July 1. The questions of revision of fares and the advisability of electrifying the cable lines will then be considered. The Brunswick and Coburg Tramways have applied to the Board for permission to make an extension to Lonsdale Street, substituting electric for cable traction on half a mile of the route.

Mr. E. Cross, electrical engineer and tramways manager of Rotherham, has been granted an increase in salary of £50 per annum, and he will be entitled to a further increase of £50 in January next. Alderman Winter, chairman of the Electric Light and Tramways Committee, in moving the recommendation, spoke highly of the services of Mr. Cross. Up to 1904 they had employed a consulting

Digitized by Google

engineer, but since then the work has been done entirely by Mr. Cross, and he had saved the Corporation thousands of pounds. Mr. Cross had been with them fifteen and a half years, and since 1905 had controlled both the tramways and the electricity undertakings.

Death of Professor S. P. Thompson.—Among all concerned in the physical sciences and in electricity in particular, deep regret has been caused by the death of Professor Silvanus P. Thompson, which took place on Monday. Born in York sixty-five years ago, he had a brilliant college career, ending with the degrees of B.Sc. and D.Sc. of London University in 1875 and 1878 respectively. After holding a professorship at Bristol, he came to be Principal of the City and Guilds of London Technical College, Finsbury, in 1885, which position he has since held. With a wide range of knowledge of the physical sciences, he is best known in the domain of electricity. His great work on "Dynamo-Electric Machinery" has run through many editions since it was first published in 1884, and it remains a standard book of the greatest possible value. In his multifarious activities he has published many other works, including scientific biographies of Kelvin and Faraday. In lecturing and even in extempore speaking he was a master of clear exposition. In fact he might be compared to Herbert Spencer in his lucidity and order in expounding a complicated subject. Electrical students the English-speaking world over owe him a deep debt of gratitude. Professor Thompson was in succession president of a number of the scientific and technical societies.

Sergeant J. J. Stephenson, signalling instructor in the South Lancashire Regiment, and formerly a motorman on the Nelson Corporation Tramways, has been killed in action. He was mentioned in Sir John French's despatch of January last, and he also served in the South African war.

CONTRACTS AND ORDERS.

Hadfields, Ltd., have received an order from Bradford Corporation for 100 steel tire wheels with axles, at £19 11*s.* 6*d.* per set.

The Brush Electrical Engineering Company, Ltd., have received an order for two 150 k.v.a. and one 250 k.v.a. three-phase transformers from Bradford Corporation.

The Victorian Railways Department has accepted the tender of the British Insulated and Helsby Cables, Ltd., for three-core cables for Newport workshops.

The Z Electric Lamp Manufacturing Company has obtained a contract for twelve months for the supply of Z drawn-wire metal filament lamps from the Great Northern Railway.

Loughborough Town Council has authorised Mr. W. H. Allen to purchase a two-ton electric truck at a cost of £600, to be used for the cartage of coal between the railway siding and the electricity works.

Rawtenstall Town Council has accepted the following tenders:—The British Westinghouse Company, transformer and switch panel; British Thomson-Houston Company, switchgear; W. T. Glover and Company, cables; Oates and Green, conduits.

FINANCIAL REPORTS AND MEETINGS.

Provincial Tramways. An interim dividend of 8*d.* per share on the ordinary shares for the year ending September 30 next, will be paid on the 19th inst.

Yorkshire (West Riding) Electric Tramways Company, Ltd.—The directors have decided to pay on July 1 an interim dividend of 3 per cent., being at the rate of 6 per cent. per annum, on account of the dividend accrued on the 6 per cent. cumulative preference shares.

Waygood-Otis, Ltd.—The profit for the year ended March 31, 1916, is £12,798, making with balances a total of £14,544. Depreciation of plant, etc., absorbs £3,900, Otis amalgamation expenses £1,022, chairman and managing director's remuneration and directors' fees £6,542, and National Service grants to the dependents of employees £2,306, leaving a balance to be carried forward of £671.

Nottingham Corporation Tramways.—The report of the Tramways Committee for the year ended March 31, 1916, shows that the undertaking has passed very successfully through a year of exceptional difficulty. The comparative results are indicated by the appended summary, covering the past three financial years:—

	Year ended March 31.		
	1916.	1915.	1914.
Total capital expenditure	£735,382	£733,674	£667,705
Amount outstanding . .	£449,826	£473,999	£410,091
Total revenue	£195,392	£179,315	£175,379
Working expenses . . .	£121,266	£112,583	£108,422
Gross balance	£74,126	£66,732	£66,957
Net profit	£33,500	£28,664	£31,013
Passengers carried . . .	45,741,208	41,210,964	40,535,874
Fare per passenger . .	1.01*d.*	1.02*d.*	1.02*d.*
Car Mileage	3,885,322	3,789,857	3,543,669
Units per car mile . . .	1.64	1.53	1.51
Power cost per car mile .	2.25*d.*	1.91*d.*	1.92*d.*
Receipts per car mile . .	12.06*d.*	11.35*d.*	11.87*d.*
Expenses per car mile .	7.49*d.*	7.13*d.*	7.34*d.*
Ratio of expenses . . .	62.10	62.78	61.82
Total track mileage . .	44.25	44.25	37.40
Number of cars in stock .	155	155	135

Considerable permanent way renewals have been carried out, the total expenditure being £21,167. This amount has been charged to the reserve and renewals fund, which now stands at £50,375. Nine miles of overhead trolley wires, with the necessary fittings and span wires, were renewed, the cost being charged to working expenses.

Colchester Corporation Tramways.—As shown in the appended summary, the net profit for the year ended March 31 amounted to £440, which compares with a loss last year of £402. The improvement is mainly due to the increased numbers of troops in the vicinity, which goes to prove, as Mr. Bullough, the general manager and engineer observes, that the permanent success of the tramways is wholly dependent on a larger population. The increase in working expenses was due to expenditure upon general repairs and maintenance, and cars. Mr. Bullough has taken advantage of the prosperous times to overhaul thoroughly the rolling stock and equipment.

	Year ended March 31.		
	1916.	1915.	1914.
Capital expenditure	£69,471	£60,471	£69,401
Amount outstanding	£45,769	£48,360	£50,816
Total revenue	£15,713	£13,793	£10,899
Working expenses	£10,670	£9,570	£8,812
Gross balance	£5,043	£4,223	£2,087
Net profit	£440	– £402	– £2,333
Passengers carried	2,816,617	2,434,786	1,757,794
Fare per passenger	1.30*d.*	1.32*d.*	1.42*d.*
Car mileage	331,099	332,963	324,622
Units per car mile	1.37	1.34	1.26
Power cost per car mile ...	2.060*d.*	2.006*d.*	1.897*d.*
Traffic receipts per track mile	£1,928	£1,689	£1,399
Traffic receipts per car mile...	11.41*d.*	9.063*d.*	8.058*d.*
Expenses per car mile ...	7.734*d.*	6.898*d.*	6.515*d.*
Ratio of working expenses ...	67.79	69.24	80.36
Total track mileage	7 miles 75.18 chains	7 miles 75 chains	7 miles 75 chains
Number of cars in stock ...	18	18	18

Brighton Tramways Good Year.—After payment of interest, sinking fund charges and income tax, Brighton Corporation tramways have a balance in hand of £2,230 for the year ended March 31 last. The previous year the balance was only £18. A summary of the report is as follows:—

	1915–16.	1914–15.
Income	£57,936 4 11	£56,525 19 6
Expenditure ...	£41,001 0 8	£42,517 8 1
Balance ...	£16,935 4 3	£14,008 11 5

From these balances there had to be allocated interest, sinking fund, and income tax, amounting in each of the two years to:—

Interest	£7,347 11 10	£7,660 13 4
Sinking fund ...	£6,429 8 10	£5,917 4 3
Tax	£965 10 1	£467 6 8
Totals ...	£14,742 10 9	£14,045 4 3

It was only possible to meet these charges last year from the fact that bank interest gave a credit of £54 15*s.* 5*d.*, leaving £18 2*s.* 7*d.* to carry forward. This was allocated to reserve and renewals fund. Bank interest this year was £38 0*s.* 1*d.*, which added to the balance of £2,192 13*s.* 6*d.*, gave £2,230 13*s.* 7*d.*, which will doubtless be added to the Reserves Renewals Fund, at present amounting to £3,235 13*s.* 5*d.* Other comparisons for the past three years are:—

	1915-16	1914-15	1913-14
Electricity used	1,678,627	1,676,770	1,722,548
Car miles run	1,053,285	1,108,352	1,156,584
Revenue per car mile ...	13.202*d.*	12.24*d.*	11.79*d.*
Expenses per car mile ...	8.47*d.*	8.91*d.*	8.80*d.*
Expenses to receipts	64.14	72.79	74.66
Passengers per mile	12	11	10
Passengers	12,295,198	11,837,828	11,330,515

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of forty-five of the principal tramway undertakings in the United Kingdom for the week ended June 3, give total receipts of £185,411, or £12,499 more than in the corresponding week of last year. The total length of track included in the returns was 2,252 miles, or seventy more than for the corresponding week. The receipts this year were at the rate of £82 6*s.* 7*d.* per mile of single track, and last year at the rate of £79 4*s.* 10*d.*, thus showing an increase for the week of £3 1*s.* 9*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. June 15.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	68	68½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	70/7½	70/7½
4%	4%	Do. 4% Deb. ...	100	91	76½	76
4½%	4½%	Do. 4½% Deb. ...	100	98½	75½	75½
5%	5%	Do. 5% Deb. ...	100	96	77	77½xd
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	18/3	18/3
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	95⅛	95⅛
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ..	10	11⅜	10 5/16	10½
4½%	4½%	Do. 4½% Deb....	100	96	85	85
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$½	$1	Brazilian Trac. & Power Ord. ...	$100	66	63½	63½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	94⅜	95½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅞	6⅞xd
2/6	2/6	Do. 5% Cum. Pref.	5	5	89/-	89/-xd
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	91
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	38½	38½
6%	5%	Do. Pref. Ord....	100	106	40	40½
5%	5%	Do. 5% Cum. Pref.	100	103	58½	57¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	63¾	63
6%	6%	Brit. Elec. Trac. 6% Pref. ...	100	87	80	75
70/-	70/-*	Do. 7% Pref.	100	55½	49	49
—	—	Do. 6% Pref. Ord.	100	17½	17	17 1/16
—	—	Do. Def. Ord.	100	11	10	10
5%	5%	Do. 5% Deb.	100	92	79¾	80
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70½	68½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6½	6 5/16
1/3	1/3	City of B.A. Trams.	5	5½	93/4½	93/9
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	89	89
5/-	5/-	Dublin United Trys 6% Pref.	10	12	10⅛	10½
3%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	80¾	81½d
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½xd	74½
—	—	La Plata Trams. Ord.	1	¾	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10⅛	9 25/32	9 25/32
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	13/16	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	8/6	8/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	57	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	90½	90½
5%	5%	Do. 5% Inc. Deb.	100	88½	81	79½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48½	48½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	103½	101¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70½xd	72½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½	80½
$1½	$1½	Mexico Trams. Common ...	$100	70	27½	27½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40¾	42
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	94
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92½	92½
1/2*	1/2½*	National Steam Car	1	13/32	15/3	15/6
9¾d.*	9¾d.*	New General Traction	1	½	7/9xd	7/9
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	21/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	61/3	61/3
5%	5%	Do. 5% 1st Deb.	100	89½	70½	70
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	83½	81
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/6	10/7½
8d.	10d.	Provincial Trams. Ord.	1	¾	17/3	17/3
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	93	91
5%	5%	1st. Mt. 5% 50 yr.	100	89½	81¾	81
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	87½	89½xd
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	78½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	94¼	93¾
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	91¾
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	74⅞	74
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	June 10	£50,398	£48,644	24	£1,180,865	— £3,614
Auckland (28 days)	May 5	20,447	21,202	44	231,906	+ 4,308
Ballarat and Bendigo ...	Apr. 23	3,920	3,727	4	3,727	— 193
Brazilian Traction Mlrs.	Apr.	6 333 460	6,678,000	18	25,898,000	+1,475,940
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia $	Apr.	540,861	549,046	43	5,531,193	— 764,709
Buenos Aires Lacroze ...	May 11	44,480	41,503	48	454,605	— 11,116
Burmah Tramway ... Rs.	June 10	4,516	4,155	45	...	+ 6,450
Calcutta Rs.	„ 10	64 889	65,311	24	1,544,300	+ 84,128
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	May	1,931	2,927	22	12,857	+ 4,268
Cordoba	Mar.	12,746	13,598	52	161,906	+ 6,251
East India	May	2,119	2,161	43	20,867	+ 1,508
Hong Kong $	May 13	8,911	16,774	22	254 827	+ 53,415
Kalgoorlie	March	2,638	2,479	13	6,963	— 399
La Plata	May	4,489	4,343	22	22,189	+ 301
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon Escu.	Apr.	...	190,051	18	712,651	...
Madras (2 weeks) Rs.	May 31	29,228	29,191	21	310,815	+ 24,500
Manila $	Apr.	117,450	124,350	...	505,381	+ 16,765
Manaos Rs.	March	...	157,156	...	...	...
Melbourne	Feb.	59,086	69,395	9	139,274	+ 17,459
Montevideo	May	27,771	28,349	30	215,768	+ 13,342
Peruvian $	May	737,166	826,900	48	8,833,997	+1,233,666
Port Elizabeth	Mar.	...	3,857	...	...	...
Puebla Tramway $	*	...	...	...	...	...
Rangoon	May	4,887	4,589	22	24 376	— 372
Shanghai $	May 10	24,552	29,263	...	...	...
Singapore $	May 6	12,014	13,175	18	221,047	+ 25,846
Toronto $	Apr.	795,816	883,209	18	3,546,784	+ 319,541
Winnipeg	Apr.	264,856	282,498	18	1,169,808	— 63,597

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare	June 6	£335	£351	+ 16	10	£3,591	+ £88
Aberdeen Corporation...	„ 7	2,258	1,855	— 403	1	1,855	— 403
Accrington Corp.	May 24	728	613	— 115	8	4,566	+ 45
Ayr Corporation	June 10	365	380	+ 15	4	1,353	— 4
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 11	1,412	1,534	+ 122	10½	15,144	+ 938
Birmingham Corp.	„ 10	13,202	15,953	+ 2,750	10	165,385	+ 28,458
Do. Motor Omnibuses	„ 10	892	869	— 23	10	9,272	+ 844
Blackburn Corp.	„ 7	1,294	1,124	— 170	10½	13,344	— 661
Blackpool & Fleetwood.	„ 3	879	648	— 231	22	9,417	— 237
Blackpool Corp.	„ 8	1,116	892	— 224	10	12,611	— 123
Bolton Corporation	„ 11	2,832	2,795	— 37	11	29,677	+ 1,859
Bournemouth Corp.	„ 14	2,079	2,310	+ 231	11	23,797	+ 175
Bradford Corporation	„ 10	6,772	6,200	— 572	10	68,396	— 1,889
Brighton Corporation	„ 11	1,122	1,143	+ 21	10¾	11,564	+ 550
Bristol	„ 9	9,737	9,558	— 179	23	217,320	+ 6,949
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	„ 10	1,543	1,525	— 18	11	18,740	— 1,448
Burton-on-Trent Corp...	„ 4	281	266	— 15	9	2,373	— 351
Bury Corporation	„ 4	1,488	1,336	— 152	9¾	13,422	— 40
Cardiff Corporation	„ 3	2,644	2,852	+ 208	9	26,359	+ 1,090
Chatham & District	„ 8	1,316	1,183	— 133	23	25,644	+ 1,045
Chesterfield Corp.	„ 1	255	270	+ 15	9	2,495	+ 81
Colne Corporation	„ 19	262	243	— 19	...	...	...
Cork Electric	„ 8	555	508	— 47	23	10,721	— 224
Croydon Corporation	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	June 10	1,071	1,065	— 6	10½	11,390	+ 332
Dover Corporation	„ 10	308	293	— 15	10	3,102	— 20
Dublin & Lucan	„ 9	160	154	— 6	23	2,839	— 371
Dublin United	„ 9	6,389	6,092	— 297	23	124,950	— 9,799
Dundee City	„ 7	1,385	1,392	+ 7	3¾	4,593	+ 202
East Ham Corporation	„ 10	1,362	1,298	+ 64	10½	13,258	— 178
Exeter Corporation	„ 9	416	364	— 52	10	3,734	— 162
Glasgow Corporation	„ 10	22,802	23,559	+ 757	13/7	35,067	+ 3,038
Glasgow Subway	„ 10	1,012	1,110	+ 98	23	27,928	+ 2,998
Glossop (U. Elec. Supp.)	„ 10	136	127	— 9	24	3,176	+ 373
Halifax Corporation	„ 6	2,208	2,102	— 106	9¾	21,425	— 902
Do. Motor Omnibuses	„ 6	49	45	— 4	9¾	438	— 72
Hastings & District	„ 9	957	923	— 34	23	19,248	+ 254
Huddersfield Corp.	„ 10	2,768	2,654	— 114	10	29,197	+ 1,725
Hull Corporation	„ 10	3,406	3,074	— 331	10	31,220	— 1,213
Ilford U.D.C.	„ 10	690	645	— 45	10	7,012	+ 401
Ilkeston Corporation	„ 14	132	141	+ 9	11	1,469	+ 63
Ipswich Corporation	„ 10	588	548	— 40	10	5,166	+ 190
Isle of Thanet	„ 10	414	309	— 105	36	9,749	— 1,836
Kilmarnock Corp.	„ 10	165	161	— 4	3¾	605	— 58
Lanarkshire	„ 8	2,093	2,310	+ 217	23	50,038	+ 8,089
Lancashire United	„ 7	1,777	1,652	— 125	23	38,464	+ 1,26
Leeds City	„ 10	9,383	9,169	— 214	11	98,100	+ 7,087
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	„ 10	815	843	+ 28	3¾	3,190	+ 212
Leyton U.D.C.	„ 8	1,625	1,554	— 71	10	16,223	— 82
Liverpool Corporation	„ 3	13,562	14,296	+ 734	22½	298,883	+ 13,657
Llandudno & Colwyn B.	„ 9	358	339	— 19	27½	6,419	— 548
London County Council	May 24	12,610	49,920	+37,310	7½	365,415	+ 46,678
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	June 10	188	132	— 56	35½	4,642	— 1,379
Maidstone Corporation..	„ 8	212	192	— 20	10	2,170	— 66
Manchester Corp.	„ 10	18,348	17,617	— 731	10	188,312	+ 5,221
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	„ 10	197	180	— 17	10½	2,210	+ 165
N'castle-on-Tyne Corp.	May 27	6,531	6,548	+ 17	8	50,579	+ 814
Newport (Mon.) Corp....	June 10	870	897	+ 27	10	9,215	+ 1,349
New St. Helens & Dist.	„ 7	1,018	892	— 126	49	48,630	+ 2,728
Northampton Corp.	„ 9	787	640	— 147	10	6,911	— 874
Nottingham Corp.	„ 8	3,768	3,663	— 105	10	37,649	+ 796
Oldham Corporation	„ 11	2,323	2,447	+ 124	11	27,781	+ 1,035
Portsmouth Corp.	„ 10	2,631	2,472	— 159	11	27,147	...
Preston Corporation	„ 7	932	1,032	— 100	9¾	16,394	+ 858
Provincial	„ 10	2,375	2,182	— 193	36	76,838	+ 4,610
Reading Corporation	„ 8	802	761	— 41	9¾	7,970	+ 334
Rhondda Tramways	„ 1	1,263	1,233	— 30	22	26,283	+ 1,100
Rochdale Corporation	„ 10	1,706	1,609	— 97	10½	18,330	— 117
Rotherham Corp.	„ 14	1,143	1,571	+ 428	10½	15,163	+ 3,166
Salford Corporation	„ 12	5,439	5,374	— 65	10¾	56,514	+ 1,640
Sheffield Corporation	„ 13	8,824	10,226	+ 1,402	11	113,140	+ 17,945
Southampton Corp.	„ 7	1,477	1,503	+ 26	9¾	15,104	+ 711
Southend-on-Sea Corp...	„ 7	750	797	+ 47	10	7,600	— 725
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	„ 3	766	818	+ 52	9½	7,250	+ 244
Sunderland Corp.	„ 11	1,558	1,563	+ 5	10	15,905	+ 479
Sunderland District...	„ 7	543	592	+ 49	32	18,399	+ 934
Swindon Corporation	„ 7	206	182	— 24	9¾	1,922	+ 15
Torquay Tramways	„ 8	535	511	— 24	23	10,983	— 118
Tyneside Trys. & Tmrds.	„ 10	659	602	— 57	23	12,055	— 651
Wallasey Corporation	„ 10	1,323	1,236	— 87	10½	13,202	+ 26
Walsall Corporation	„ 1	742	796	+ 54	24	18,367	+ 2,149
Walthamstow U.D.C.	„ 3	893	1,152	+ 259	9	9,834	+ 1,573
Warrington Corp.	May 18	443	473	+ 30	7	3,335	+ 353
West Ham Corporation	June 8	3,205	3,176	— 29	9¾	32,130	+ 1,424
Wigan Corporation	„ 8	1,473	1,703	+ 230	10	16,378	+ 830
Wolverhampton Corp.	„ 14	1,076	1,382	+ 305	11	13,083	+ 1,168
Yorkshire (W. Riding)	„ 11	1,602	1,761	+ 159	24	39,972	+ 3,143

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION AND MAINTENANCE

BY

R. BICKERSTAFFE HOLT,

HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.).

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,

AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE

Tramway & Railway World

Vol. XXXIX. No. 32.] LONDON, SATURDAY, JUNE 24, 1916. [Established in 1892.

ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF ABERDEEN.

ELECTRICITY DEPARTMENT.

TURBO-ALTERNATOR.

The Corporation of Aberdeen are prepared to receive Tenders for the supply, delivery and erection at their Electricity Works, Millburn Street, Aberdeen, of one 5,000 kw. turbo-alternator to run at a speed of either 1,500 or 3,000 r.p.m., together with surface condenser and auxiliaries.

Specification, general conditions, and form of Tender may be obtained on application to the undersigned on payment of a deposit of £1 1s., which deposit will be returned after a bona-fide offer has been received and opened.

Duplicate copies of specification, etc., may be had on payment of 5s. per copy, not returnable.

Sealed Tenders marked "Turbo-Alternator," and addressed as under, to be delivered here not later than 12 noon, on July 7, 1916.

J. ALEX. BELL,
City Electrical Engineer.

Millburn Street, Aberdeen.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery, and erection, at their Stuart Street Station, of the following :—

(a) Electric or hydraulic coal wagon lift and turntable.
(b) Saddle tank steam locomotive.

Specifications, drawings, and forms of tender may be obtained on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of one guinea for each specification, which amount will be refunded on receipt of a bona fide tender.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, Chief Electrical Engineer, Dickinson Street, Manchester.

Tenders, duly endorsed, and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall, not later than noon, on Tuesday, July 11 proximo.

The firm entrusted with this work will be required to enter into a contract to be prepared by the undersigned. The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
June 21, 1916.

COUNTY BOROUGH OF ROTHERHAM.

The Rotherham Corporation invite tenders for their requirements during the ensuing twelve months of the following :—

1. Tramway Stores and materials, printing, stationery, oils, grease, tools, brake blocks, paints and varnishes, lamps, etc.
2. Smudge and pea nuts.
3. Single vulcanised bitumen cable, high-tension cable, rubber insulator cable, and trolley wire of various sizes.
4. Ampere hour meters of sizes and maximum currents of 2, 5, 10, 25, and 50 amperes, supply pressure 230 and 430 volts.
5. Motormen's oilskin coats and conductors' mackintosh coats.

Forms of specification, tender and particulars can be obtained on application to the Engineer and Manager, Electricity Works, Rotherham.

The persons or firms whose tenders are accepted will be required to enter into contracts which will contain the usual Fair Contracts Clause.

The tenders, properly endorsed, to be sent to me not later than July 3 next.

By order,
CHAS. L. DES FORGES,
Town Clerk.

Town Hall, Rotherham.

POSITIONS VACANT.

LEEK URBAN DISTRICT COUNCIL.

JUNIOR ASSISTANT.

Junior Assistant required immediately for D.C. power station. Gas and Diesel engines.

Applicants should have had good technical training and some previous experience.

Salary 30s. per week.

Applications, stating age, experience, and when duties can be commenced, and accompanied by three recent testimonials, to be sent to, "Manager," Electricity Works, Leek.

DRAUGHTSMEN.

Wanted for factory near London, several first-class draughtsmen, thoroughly accustomed to the design of heavy motor road vehicles (petrol). Apply, stating age, experience and salary required, to nearest Labour Exchange, mentioning No. A 1971. Application from men at present employed on Government work will not be entertained.

TRACTION MOTORS WANTED.

Wanted, two good second-hand Traction Motors, about twenty-five h.p., for a small electric locomotive. Any type. Address, Box No. 48, "The Tramway and Railway World," Amberley House, Norfolk Street, London, W.C.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire, and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission of Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of Coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

Lancashire and Yorkshire Electrification.

MANCHESTER-BURY SECTION—DIRECT CURRENT SYSTEM AT 1,200 VOLTS.

"THE TRAMWAY AND RAILWAY WORLD"

of January 13, 1916, contains a 30-page description of the latest enterprise of the Lancashire and Yorkshire Railway in the electrification of their lines which was initiated in 1904 by the equipment by Dick, Kerr & Co. of the Liverpool and Southport section on the 500 volt direct current system. In the present instance current at 1,200 volts is sent out on the conductor rails, and the train motors are designed for working at this pressure. The description is accompanied by over 50 clear drawings and photographs.

Digitized by Google

"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.

Sole Manufacturers:
TYNE METAL COMPANY, Ltd.,
SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
Tramway Engineers.
Sole Selling Agents for S. Dixon & Sons Tramway Material,
160, WOODHOUSE LANE, LEEDS.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." **Telephone:** 3488 Leeds.
OVERHEAD LINE MATERIAL AND SUPPLIES.

North-Eastern Railway Electrification.
SHILTON-NEWPORT BRANCH.
"THE TRAMWAY AND RAILWAY WORLD"
of June 8, contains a full description of this important, and in some respects, unprecedented undertaking. The description is supplemented by 35 photographs and drawings, including a map, profile of gradients and diagrams of tests.

DOCKERS'
SUPERFINE PAINTS
and
EXTRA DURABLE
VARNISHES
for
TRAMCARS.

DOCKERS'
"HERMATOR" PAINTS
AND ENAMELS
for
POLES AND POWER STATIONS.

Catalogues and Pattern Books free on application.

DOCKER BROTHERS, Ltd.,
170, Bishopsgate, LONDON, E.C.,
And BIRMINGHAM.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

—(NATURAL, GLAZE, DULL FINISH, OR COLOURED)—
in twill, straight, or fancy weaves, canvas backed or unbacked, is

BRITISH MADE THROUGHOUT

from the splitting of the cane to the finished article.

We hold LARGE STOCKS OF RAW MATERIALS and can GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

THE

Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JUNE 24, 1916.

WORKING EXPENSES AND EFFICIENCY OF SERVICE.

One of the problems which is always facing the tramway manager is the maintenance of a proper adjustment as between the working expenses of the undertaking and the efficiency of the service to the public. The aim, of course, is to keep the former down and to keep the latter up. Within limits the double object can be and is achieved, but beyond a certain point it is obvious that working expenses cannot be reduced without sacrificing efficiency. It cannot be said that in this country tramway managers have neglected efficiency, but sometimes a feeling is created that attention is unduly concentrated on getting the hundredth part of a penny knocked off the working expenses per car mile. In the case of a tramway which is struggling for existence such a course is justifiable, but, fortunately, most of our tramways are in no such evil plight. We must bear in mind that even in the case of municipal tramways the mass of the people who use the cars do not feel personally interested in what the working expenses per car mile are, so long, at least, as ends roughly meet. But they are deeply and personally interested in the efficiency of the service from their point of view. Such efficiency includes speed, regularity, frequency, safety, comfort, and so forth. In a working-class community or district where fares are very low, extreme efficiency must no doubt, to a certain extent, sometimes take second place to the sheer necessity of keeping down expenses to the very minimum. But there are many districts in which the bulk of the passengers would not object to pay, if necessary, a slightly higher fare for the sake of increased efficiency, particularly in the direction of time-saving by means of a more frequent service, or higher car speed, or both. A recent formulation of ideas on the subject among street railway men in America is that reasonable service is that service which the public is willing and able to pay for. Now, a great point would be gained if tramway services could be differentiated to suit different local needs in a way analogous to the differentiation of services on railways. Districts occupied by the middle and upper classes could take a more highly-efficient service than those in which the working classes greatly predominate; and they could pay somewhat higher fares. Higher average car speed means improvements in methods of loading and unloading and possibly the elimination of some more or less superfluous stopping places. If any increase in fares were thought desirable—and in many places increases are justifiable—managers could look to the increased efficiency to prevent any falling-off in the number of passengers. These general reflections on possibilities may suggest to managers and tramway committees lines of investigation and experiment quite as worthy of the most constant pursuit as the making of microscopic savings in working expenses. It will probably be found as time goes on that the subject of increasing the revenue per car mile will be of growing importance, because of the general feeling that after the war wages will not come down to pre-war level. The call will be for a higher standard of comfort and of wages all round. That situation will have to be met so far as tramways are concerned by greater efficiency of the service to the public, and possibly in many cases by raising fares. Practically every commodity has gone up in price, and a few towns have already raised their tramway fares. Some others may have to follow suit. But in any case, let more passengers be attracted by the highest possible efficiency of service.

TIME TABLES AND DUTY SHEETS.

At the May Efficiency Meeting of the Operating Department of the London Underground Railways and General Omnibus Company group, held at the L.G.O.C. Training School, Milman Street, Chelsea, S.W., a paper on "Time-tables and Duty Sheets—Comments and Criticisms on methods and practice," was read by Mr. Evan Evans of the Department of the Railway Superintendent of the Line. The chair was occupied by Mr. H. E. Blain, the operating manager, and there was again a good attendance of officials.

Mr. Evans traced the changes in the working of the Underground Railways connected with the group, numerous slides being exhibited on the screen, the first showing the constant improvement effected in the frequency of the service on the busiest section—that between South Kensington and Mansion House—during the busiest hour of the day. This had grown from twelve trains per hour in 1871 to forty-three in 1916. The influence on railway time-tables of physical limitations both imposed by the line itself and the number of its stations and junctions, as well as by the influence of the connections with other railways, was pointed out. Two standards were necessary in drafting a time-table in skeleton form, one being for an hour of the peak load and one for an hour of the slack service, and it was usual to stimulate traffic by providing a service ahead of the immediate needs with a view to development. On a time-table being put into operation, two points were kept under observation, viz., to see (a) how it fitted the needs of the traffic, and (b) how it worked. Attention to these matters had reduced the time occupied by trains over the tunnel section of the District Railway in the ratio of forty-nine to twenty-seven. Popularity and prosperity of routes were largely due to adequacy and punctuality of service, whilst unpunctuality also carried in its wake disorganisation and uneconomical working.

The railway lay-over facilities and coupling arrangements were described, and specimens of time-tables discussed. It was pointed out that the principle of non-stopping at specified stations had three distinct advantages :—

(a) The assistance it gave in regulating the loading of the trains.
(b) Reduction in time occupied on the journey.
(c) Operating economy, enabling the rolling stock to run a greater mileage and reducing the current consumption,

two out of the three of these being to the advantage of the passenger. There were different systems of non-stopping, that adopted on the Piccadilly line being called in America the "skip-stop," trains passing alternate stations which were but a short distance apart. On the District Railway, the junctions were utilised to act as relief lines, a clear run for each train being obtained by arranging for the previous train to be cleared at a junction, or itself to become a non-stop at a certain point. Methods of taking train loadings were described, together with the system of coupling and uncoupling additional carriages according to the traffic demands of different hours of the day.

In considering omnibus time-tables, it was found that, just as the introduction of electric working on the railways had permitted a decrease of from twenty-five to thirty per cent. in the running times so the displacement of the horse omnibus by the motor had achieved an equivalent improvement and allowed of much longer journeys being undertaken, the increased facilities of through travelling

Digitized by Google

being much appreciated by the public. The methods of omnibus time-table preparation were described and the particular problems involved discussed, slides being exhibited of leading charts and other interesting data.

The final portion of the paper dealt with the preparation of men's duty sheets, and the various systems in operation on both the railways and omnibuses were described and analysed, it being pointed out that this portion of the work was an exceedingly important one, requiring the exercise of considerable knowledge and skill.

The discussion was opened by Mr. E. R. Peaty, superintendent of the Time Schedules Department of the L.G.O.C., and he was followed by a number of the officials, some keen criticism resulting.

The next paper of the series will deal with Ticket Systems.

TWO FLAGRANT CASES ON THE SOUTH METROPOLITAN TRAMWAYS.

DEFALCATIONS BY CONDUCTORS.

Considerable interest attaches to prosecutions brought against two car conductors by the South Metropolitan Electric Tramways and Lighting Company. The more important case was that of Alfred Evered Frampton, who at Croydon Quarter Sessions on June 19, was charged with embezzling 1*s.* 6*d.* received by him on account of the South Metropolitan Company from Harry Wells; with stealing a weekly tram ticket and with receiving the same ticket; further with embezzling 1*s.* 6*d.* received by him on behalf of the Tramways Company from George Hutchings, and with stealing a weekly tram ticket, and with receiving the same ticket.

According to the opening statement for the prosecution, on March 27 Mr. Harry Wells purchased a weekly ticket from defendant for his journeyings between Croydon and Mitcham for 1*s.* 6*d.*, but the ticket he received was never issued to defendant, but to a conductress, Mrs. Tuck, and she had to account for it, being surcharged for it. The second charge of embezzlement was a little different, as the ticket issued to Mr. Hutchings had already been accounted for by another conductor the previous week. Thus that conductor was not surcharged, but the ticket being sold by defendant the company was again defrauded of 1*s.* 6*d.* Defendant was found to have sold the tickets, which were never served out to him nor accounted for by him, so that he must have received the tickets knowing them to have been stolen by somebody.

The jury found the defendant guilty on the two charges of embezzlement.

The Recorder (Mr. R. F. Colam, K.C.) said that if it were a case merely between the man and his employer he might be inclined to deal with it leniently, but others were affected, and it was a very serious thing. The defendant had been found guilty of a very mean and despicable offence. It must have been obvious to defendant that Mrs. Tuck would have got into trouble and either have to pay for the ticket out of her own pocket or explain its irregular use. In those circumstances he could not deal with the case under the First Offenders' Act. Nor could he listen to the suggestion that defendant should go free in order to go into the Army. He had, however, taken into consideration defendant's previous excellent character, and had it not been for that he would have passed sentence of nine or twelve months' hard labour, but because of the excellent character he would mitigate the sentence to four months in the second division. Because of his character he would be enabled to keep himself from contamination with a convicted criminal.

The other prosecution was brought against Frank Buckfield, at Penge Police Court. He was summoned for embezzling 1½*d.* and 2*d.* received by him on behalf of the South Metropolitan Company. For the prosecution it was stated that on one of his early morning journeys the defendant issued a ticket with the number 1,537, but what the passenger did with that ticket it was impossible to say; probably it was left in the car. But that morning that ticket was issued again. On the 8.11 journey he issued a ticket 9,345, and on the 12.19 journey from the Palace to West Croydon his opening number was 9,350, and he sold to Miss Wilson a ticket 9,345 for 2*d.*, the ticket he had previously sold on an earlier journey.

The Bench found the defendant guilty, and fined him £3 or twenty-one days' imprisonment in default.

SEATS FOR OMNIBUS CONDUCTORS.

The London General Omnibus Company announce that the hief Commissioner for Police has sanctioned the fitting of seats r conductors on the London motor omnibuses. The seats which will be fitted on the back platform of the omnibuses will be of neat design and so constructed as to fold up when not in use. It is hoped that in a very short time every London General omnibus will be equipped with one of the new seats, which will add to the comfort and well-being of the large numbers of women conductors who are filling the places of male conductors now on war service.

Institution of Electrical Engineers and Enemy Members.—At a meeting of the Institution of Electrical Engineers on Thursday, resolutions were finally confirmed expelling members who are subjects of enemy countries and those who being naturalised British subjects have retained enemy nationality. It is also provided that no person shall be eligible for election who is a subject of any country which is, or shall have been, at war with the United Kingdom. The president, Mr. C. P. Sparks, alluded to the way in which everybody had worked together for a common end with the result that a very difficult matter had been carried through diplomatically.

GLOUCESTER TRAMWAY FARES.

The Gloucester Town Council have received a report from the general manager of the electricity and light railways undertaking, recommending that a minimum fare of one penny should be charged, entitling the passenger to ride two stages of about half a mile each. The new arrangement will not apply to special fares for artisans, mechanics, daily labourers, and school children. Transfer tickets will be issued as at present at a charge of 1½*d.* instead of 1*d.* Hitherto, the penny fare has covered three stages. It is hoped by the increase in fares to prevent at least further calls upon the ratepayers. During the last two or three years the charge upon the rates has amounted to about £3,750 per annum, and it is quite reasonably felt that those who use the cars should be asked to pay more. Councillor James Fielding, in a discussion in the Town Council, put the matter succinctly by saying that people ought not to expect to ride on the trams below cost price. Mr. F. H. Corson in his report stated that a return of the fares on tramways throughout the United Kingdom showed that Gloucester had the lowest revenue and next to the smallest number of passengers in relation to the mileage run; that very few towns had so small a population in comparison with the length of route, and that the number of journeys made per head of population was relatively low. It was pointed out that the majority of the inhabitants did not use the tramcars, so that the majority have been paying rates for the deficit incurred by the minority.

OMNIBUS DEPRECIATION AND INCOME TAX.

A Joint Committee of the Municipal Tramways Association, the Tramways and Light Railways Association, the London Omnibus Owners' Federation, the Provincial Omnibus Owners' Association, and the Institute of Municipal Treasurers and Accountants, submitted a report to the Chief Inspector of Taxes on October 1, 1915, asking that a uniform method be arrived at for determining depreciation allowances for income tax purposes. The Joint Committee were requested to furnish the Department with the evidence available bearing upon the question, with a view to a deputation being received at a later date. Mr. A. de Turckheim, secretary of the Tramways and Light Railways Association, has informed the members of the Association that further and detailed evidence was sent in on May 3, and the matter is now under consideration.

MISCELLANEOUS NEWS AND NOTES.

Free Travel for School Children.—The Manchester Parks Committee and the Tramways Committee have agreed to carry school children during the summer holidays to Heaton Park free of cost.

War Bonus at Yarmouth.—All employees earning less than 30*s.* are to be granted a bonus of 2*s.* a week during the war. The tramway service has been extended an hour in the evening to 9.30 p.m.

Lowestoft Tramways.—At the last Town Council meeting the Deputy Mayor stated that a meeting would be called shortly to consider the position of the tramways and other municipal undertakings.

Manchester Municipal Omnibus Service.—The Tramways Committee on Monday started a motor omnibus service between Slade Lane, Longsight, and Palatine Road, Withington. Omnibuses will run along Burnage Road, Fog Lane, and Lapwing Road, to the tram terminus in Palatine Road. To begin with, the service will be a half-hourly one.

Block Parging is being found a very effective method of rail filling. Shepherd's Parging Block Company mention that many of the orders which they now have in hand are from tramways that have been supplied with numerous consignments of large quantities, and the experience obtained with the blocks on many miles of line now forms a striking testimony to their effectiveness.

Science and Engineering.—The Standing Committee on Engineering appointed by the Advisory Council for Scientific and Industrial Research, of which Sir Maurice Fitzmaurice is chairman, has held its first meeting. The representative of the Institution of Electrical Engineers on the Committee is Mr. J. S. Highfield. Other electrical members of the Committee are Mr. C. H. Merz, Mr. G. G. Stoney, F.R.S., and Prof. Miles Walker.

Melbourne Suburban Railway Electrification.—The Ministry of Munitions having refused to permit the execution of contracts for power-station plant needed for the electrification of Melbourne Suburban Railways, the consulting engineer and the agent-general in London have been instructed by the Minister of Railways to arrange for a transfer of contracts for switchgear, etc., preferably to a firm with an agency in the United States.

Oldham, Ashton and Hyde Tramways.—Ashton Town Council have decided to promote a Bill in the next session of Parliament to obtain powers for the acquisition of the tramways of the Oldham, Ashton and Hyde Tramways Company within the areas of Waterloo and Bardsley. The Corporation already have powers to purchase the lines in the borough, and by acquiring the lines mentioned, they will be able to reach Oldham. Alderman R. S. Oldham said that he believed the purchase would be one of the best things the Corporation had done.

Incorporated Municipal Electrical Association.—The annual convention, which met on Thursday and Friday, was attended by about 200 members and visitors. The meetings were held at the Institution of Electrical Engineers in London, and the proceedings were confined to the reading and discussion of papers and purely formal business. Mr. A. C. Cramb presided and delivered his presidential address; and among the papers read was an important one by Mr. W. W. Lackie, on Boiler-house Design and operation.

Digitized by Google

Southampton Fares.—A satisfactory settlement has been reached as a result of the recent agitation for cheaper fares. The maximum journey for a penny has not been increased, but the penny stages have been levelled up so as to give equal facilities to residents in all parts of the town. It is thought that this arrangement will provide a satisfactory way out of the difficulty without jeopardising the success of the undertaking.

Ilkeston Tramways.—The Ilkeston Town Council have decided, by a large majority, to sell the tramways and electricity undertaking to the Notts and Derbyshire Power Company, Ltd. The tramways were publicly opened on May 16, 1903, and during the whole of the time since then they have involved the Corporation in an annual loss of £2,000 or £3,000, equal to a rate of from 6*d.* to 9*d.* in the pound. It was recognised that considerable expenditure is now necessary to put the track in good order, and new cars will shortly be required.

Proposed Tramway for Aldershot and District.—At a recent meeting of the Aldershot Urban Council, Mr. C. A. L. Calvert said that there had been an average increase in the population of Aldershot, Farnborough and Farnham of fifteen per cent. since the 1911 census, and the population was sufficient to make a tramway scheme practicable. He proposed that the three Councils be invited to a conference to consider the promotion of a joint scheme. After a lengthy discussion the clerk was instructed to secure further information in order that the Council might again consider the question before inviting the other Councils to join them.

Universal Penny Fare.—Plymouth Town Council have adopted the recommendation of the Tramways Committee to institute a universal penny fare when through running of cars to Devonport is established. The recommendation was made on the advice of the manager, Mr. C. R. Everson, whose report on the subject was summarised in our issue of June 10. Alderman S. H. Phillips, chairman of the Tramways Committee, in advocating the proposal in the Council said that profit was not the object of corporation tramways. Two things had to be borne in mind by a tramway committee: first, making ends meet, and second, the convenience of the public.

The Admiralty and the L.G.O. Company.—Dr. Macnamara (Secretary to the Admiralty), replying in the House of Commons on June 22 to Mr. Ashley, said that the sum already paid by the Admiralty to the London General Omnibus Company since the outbreak of war was £46,460. Thirty omnibuses were purchased at a price which was estimated at £27,270, this amount being included in a larger sum which covered hire and so on for a certain period before purchase. No chassis had been purchased separately. As to what sum was still owing, the outstanding liabilities were estimated at about £3,000, but claims had not yet been received for the greater part of the items.

Brighton Omnibus License Question.—At a meeting of the Brighton Town Council, on June 15, Alderman Stringer, referring to the application made by Thomas Tilling, Ltd., for licenses for fourteen omnibuses, and also to that of the Brighton, Hove and Preston Omnibus Company, said that in his opinion the time had not come to grant licenses to Messrs. Tilling. The Committee were strongly of the opinion that the roads were too narrow for competition between different omnibus companies. Councillor Tindall, taking the opposite view, said that 12,000 signatures had been obtained by Messrs. Tilling to the petition which they had put in, and the position, he said, made the Council a laughingstock. They ought to consider the ratepayers and to obtain for them the most efficient service. The omnibus company had the monopoly of the road and they wanted to retain it, but the company would be benefited by competition. The proposal that Messrs. Tilling should be granted licenses was finally rejected by a large majority.

A New Underground Poster. The poster now appearing at all Underground stations is said to be the first contribution by Mr. Charles Sims, R.A., towards the vigorous attempt that is being made to bring art and commerce into a fitting relation. Fortunately the subject which Mr. Sims had to handle, the joy of a visit to the country round London for those jaded by toil and stress gave plenty of scope to the artist for the exercise of that fanciful spirit which is present in all that he does. He has chosen to make his lithograph a mere suggestive note rather than a finished piece of work. It is a glimpse of Arcady. Before the deep blue waters of a lake fringed with trees, play the Little People whose work it is to deck the countryside with flowers, and by their freshness and gaiety to keep its spirit alive. Mr. Sims' Little People are of kin to the "Little Archer," children who never grow old. On a tree stump stands the classical figure of a shepherd, summoning the people of London into the country with the notes of his horn. On the left of the design is a sign characteristic of the Underground. On this is the word "Arcady," and beneath it the legend, "Alight here for Air, Sun, Winds, Flowers, Birds," while the nearness of Arcady is emphasised by the words above the sign, "London 15¼ miles."

A Glasgow Damages Case.—In the Court of Session, Edinburgh, on June 16, Lord Cullen and a jury heard evidence in an action by Mrs. Helen Simpson, Glasgow, against the Corporation of Glasgow and Lyons and Company, Glasgow, for £250 damages for personal injuries. On November 11, 1914, Mrs. Simpson boarded a tramcar and while she was making her way to a seat the car attained a high rate of speed, but was suddenly drawn up with a jerk, pitching the pursuer on to the floor of the car. The Corporation denied fault, and stated that a horse and van belonging to Lyons and Company, which had been standing at the side of the road, were pulled right round across the rails. In order to prevent a collision the motorman had to bring the car to a stop. Lyons and Company attributed the accident to the system of running the cars to a fixed time-table by the Corporation. This system, they said, was defective and dangerous. The action was tried previously before Lord Skerrington and a jury, when the verdict was unanimously for the pursuer, and she was awarded £150 against both sets of defenders. On the appeal of the Corporation the First Division set aside the verdict as being contrary to evidence, and ordered a new trial. The jury now returned with a verdict exonerating the Corporation and finding the pursuer entitled to £250 damages against the other defenders.

PERSONAL.

Mr. Robert Watson, manager of the Musselburgh and District tramways, which are controlled by the National Electric Construction Company, Ltd., has resigned.

Mr. E. E. Sharp, of Messrs. Chamberlain and Hookham, and Venner Time Switches, has become Lieut. Sharp, and is at present at the Ordnance College, Woolwich.

Mr. H. Hugh Seabrook, general manager, Marylebone Electricity Department, has been granted leave by the Marylebone Council in order that he may take up special work in the Army.

Mr. C. W. Hill, a director of Messrs. Scholey and Company, Ltd., who was formerly general manager of Bournemouth Corporation Tramways, has become an Engineer-Lieutenant in His Majesty's Navy.

Mr. F. Dudley Docker, C.B., chairman of the Metropolitan Carriage, Wagon, and Finance Company, Ltd., has joined the committee of the Council for the Organisation of British Engineering Industry.

Mr. George Kidd, general manager, British Columbia Electric Railway Company, Ltd., is the subject of the portrait gallery in a recent issue of the "Brill Magazine," issued by the J. G. Brill Company, Philadelphia, and 110, Cannon Street, London. Mr. Kidd was born in Sheffield, England, in 1874, and his first position in business life was with a firm of chartered accountants at Nottingham. In 1907 he became connected with the electric railway business as secretary of the company for which he now acts as general manager. Subsequently he was appointed comptroller, and later he left the London office and took charge at Vancouver. Mr. Kidd held that position until May 6, 1914, when he became general manager of the company. We may add that his arduous labours during the past two years of retrenchment and negotiation with local authorities, necessitated by the depression, won praise from the chairman of the company at the last annual meeting. Mr. Kidd's view of the position may be gathered from the following observations attributed to him:—"The days have gone past when a public company could afford to ignore public opinion as expressed by the popularly elected bodies. I believe that the general sense of fairness that always ultimately prevails in enlightened communities will eventually adjust the balance properly between the needs of the people and the rights of the investors. The period of transition may be a very trying time for many companies, and it is important that officials of companies should, while doing all they can to please the patrons of the utility, also lose no opportunity of pressing for fair treatment for their investors."

Mr. S. E. Fedden, general manager of the Sheffield Corporation Electricity Undertaking, was recommended by the Electrio Supply Committee for a bonus of £100 in respect of extra work. The recommendation was opposed by the Establishment Committee at the last meeting of the Council and it was eventually rejected. In the course of the discussion, a report of which appeared in the "Sheffield Daily Telegraph," Councillor Stembridge said the action of the Establishment Committee was one of the best examples of false economy to be discovered in the minutes. The Establishment Committee took no steps to inquire as to what the extra work amounted to. After the war broke out their electric supply plant had to be supplemented at a cost of £500,000. Their power was increased by no less than 45,000 h.p., 24,000 h.p. of which was still waiting to be utilised. Before the war 60 million units were used, to-day 120 million units were used per annum, and when all the applicants were connected no less than 200 million units would be in supply. That gave a small idea of the extra work that the Electric Supply Department had done since the war, and in spite of that fact the Establishment Committee, instead of considering the question of a permanent increase of salary to their general manager, turned down a paltry proposal to present him with £100. He was not sorry that it had been turned down, because the Council would soon have to consider the question of Mr. Fedden's salary. He would like to point out what the salaries of such men in other places were. Mr. Fedden was getting £900 per annum. In Birmingham the salary was £1,400, in Liverpool £1,500, in Manchester £1,500, in Nottingham £1,350, and in a place like Salford it was no less than £1,000 per year.—Councillor C. H. Smith said that the Establishment Committee had made inquiries, and the reason why the proposal was turned down was because they realised they would be setting a precedent.—Councillor Evans said it had been his intention to move an amendment to the Establishment Committee's report, but in view of Councillor Stembridge's figures he intended to support a proposal for an increase of Mr. Fedden's salary.

Mr. James Pearson, whose death is reported at the age of sixty-five years, was for some years chairman of the Blackpool Lighting and Tramways Committee.

Wanted copies of the issue of THE TRAMWAY AND RAILWAY WORLD, January 1, 1916 (Volume 39, No. 1). Address: G. E. Stechert and Co., 2, Star Yard, Carey Street, Chancery Lane, W.C.

Digitized by Google

CONTRACTS AND ORDERS.

The Stirling Boiler Company have received an order from West Hartlepool for a water-tube boiler.

Willans and Robinson have an order for a turbo-alternator with condenser and auxiliary plant, from Wolverhampton Corporation. The amount of the contract is £19,000.

Wolverhampton Electricity Committee have recommended the acceptance of the tender of the Stirling Boiler Company for two water-tube boilers and superheaters at £6,606, and with the Underfeed Stoker Company for two sets of mechanical stokers at £1,907.

FINANCIAL REPORTS AND MEETINGS.

Anglo-Argentine Tramways Company.—No interim dividend will be paid on the second preference shares.

Silvertown Tramways.—An interim dividend of 1s., and a bonus of 1s. per share will be payable at the Union Bank of Australia on June 28.

Melbourne Tramways and Omnibus.—Cable advice has been received from Melbourne of the declaration of a dividend of 6d. per share and a bonus of 2s. per share for quarter to June 30, payable July 1.

A Manchester Record.—The fine weather on Saturday, June 17, resulted in a record day's takings for the Manchester tramways. The receipts were £4,537. The highest amount previously received on one day was £4,144, on August 3, 1908, when the Lancashire Agricultural Show was held in Manchester. The total for the week was, however, lower than that for the corresponding period last year. The figures are £20,880 for last week and £21,017 for the previous year.

Glasgow Tramway Records.—The Tramways Department, thanks to brilliant weather, have reported the creation of three new records. These were for the week ended June 17, for Saturday, June 17, and Sunday, June 18. For the seven days which ended on the Saturday night the receipts were £24,661, as compared with £23,543 in the preceding week and £22,920 in the corresponding week of June last. On Saturday £5,506 was received, as against £5,090 in the previous week and £4,846 in the corresponding week of last year. Sunday's drawings were £3,051, as compared with £2,659 on the previous Sunday and £2,753 on the corresponding Sunday twelve months ago.

Birmingham Corporation Tramways.—The following is a summary of the results for the year ended March 31, 1916, in comparison with the two previous years:—

	Year ended March 31.		
	1916	1915	1914
Capital expenditure	£2,489,431	£2,472,938	£2,334,437
Amount outstanding	£1,934,790	£1,940,158	£1,913,559
Traffic revenue	765,036	640,091	628,016
Total revenue	771,117	647,014	635,471
Working expenses	534,080	473,879	445,507
Gross balance	237,037	173,135	189,964
Net profit	50,000	47,596	75,972
Passengers carried	163,258,584	149,443,199	146,930,986
Fare per passenger	1.12d.	1.03d.	1.03d.
Car mileage	14,151,683	14,232,902	14,268,244
Units per car mile	1.9	1.7	1.7
Power cost per car mile	2.17d.	1.912d.	1.913d.
Traffic receipts per track mile	£6,204	£5,384	£5,482
Traffic receipts per car mile	12.974d.	10.793d.	10.564d.
Expenses per car mile	9.057d.	7.991d.	7.494d.
Ratio of working expenses	69%	73%	70%
Total track mileage	123 miles	118 miles	114 miles

The United Electric Tramways of Montevideo.—Mr. G. A. Touche, M.P., presiding at the twelfth annual ordinary meeting, said that the directors had again to report a year of difficulties and troubles. The shortage of tonnage had increased freight rates enormously, and the coal situation had occasioned much anxiety. Failing British coal, it had become necessary to rely on American, although it was not of the same steaming qualities as Welsh coal. Large railway companies and other consumers of coal in Uruguay had formed a committee to regulate as far as possible the export of coal to the River Plate. The Admiralty had agreed to liberate a certain amount of requisitioned shipping to carry coal from American ports to the River Plate. The cost of this coal delivered in Montevideo would be approximately 105s. per ton, of which 85s. represented freight. This compared with the pre-war price of 40s. 6d. The fuel difficulty had not reached its most acute stage during the period covered by the accounts, but during the current year it must represent a serious charge on the company's receipts. Climatic conditions in Montevideo had also been unfavourable and the season at the company's hotel at Pocitos had suffered on that account. Rigid economies had been carried out in every department and none of the adverse conditions should be permanent. In the circumstances the directors felt unable to recommend the payment of any dividend on the ordinary shares. The chairman then discussed the proposal that had been made to acquire the undertaking by the Municipality. They had informed the authorities that if the Government were prepared to make a definite offer on a fair and reasonable basis of valuation, the directors would be pleased to give the offer serious consideration. It was to the development of potential value that the directors looked mainly for the reward of their enterprise, and if the Municipality purchased, they would have the benefit of that development. Since the report was issued, a cablegram had been received from Montevideo, stating that the Government had made a proposal, and that information was being sent by mail as to its terms and conditions. If in their opinion it was of a nature to be submitted to the shareholders, the directors would call a further meeting.

Glasgow Corporation Tramways.—The financial year of the Glasgow Corporation tramways, which closed on May 31, was marked by several exceptional features. As will be seen from the comparative abstract given below, the surplus to the common good, which is the sum remaining after the payment of all charges and reserves, and may be regarded as the net profit, amounted to £43,548, as compared with £12,951 in the previous year. This notable result has been obtained in spite of the fact that the payments to dependants of the men on active service and supplementary allowances have increased from £51,817 to £80,438. On the other hand, the traffic receipts show the very large expansion of £78,570, and against this there is only a relatively small increase in expenses of £8,834. A notable item in the accounts is the growth in the income tax, which has risen from £22,789 to £39,853, an increase of £17,064.

	1915-16	1914-15	1913-14
Traffic receipts	£1,149,264	£1,070,694	£1,078,691
Sundry receipts	8,072	6,183	5,156
Total revenue	£1,157,336	£1,076,877	£1,083,847
Traffic expenses	£350,186	£345,625	£332,546
General expenses	144,297	142,020	134,034
Maintenance and repairs	133,659	144,530	156,214
Power expenses	64,346	51,995	53,483
Clydebank bridges	516	—	—
	£693,004	£684,170	£676,277
European War	80,438	51,817	—
Total expenditure	£773,442	£735,987	£676,277
Balance carried to net revenue account	£383,894	£340,890	£407,570
Dumbarton Tramways	—	126	180
Interest on investments	81,203	65,700	64,809
Total	£465,097	£406,717	£472,559
From which there fall to be deducted:—			
Rent of Paisley lines	£6,700	£5,659	£5,830
Interest on capital	90,474	78,797	82,921
Sinking fund	109,614	105,491	102,607
Income tax	39,853	22,789	14,057
Parliamentary expenses	500	8,817	609
Renewal and depreciation	174,408	172,310	212,642
Total	£421,549	£393,766	£418,666
Surplus to Common Good	£43,548	£12,951	£53,893

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of forty-five of the principal tramway undertakings in the United Kingdom for the week ended June 10, give total receipts of £179,513, or £2,421 more than in the corresponding week of last year. The total length of track included in the returns was 2,252 miles, or seventy more than for the corresponding week. The receipts this year were at the rate of £79 14s. 3d. per mile of single track, and last year at the rate of £81 3s. 2d., thus showing a decrease for the week of £1 8s. 11d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

THE TRAMWAY AND RAILWAY WORLD
can be obtained, post free, at the following rates:
For the United Kingdom—Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers). One Shilling per Single Copy.
For Places Abroad—Thirty Shillings per annum.

Digitized by Google

PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. June 22.	A Week Ago.
5%	5%	Alabama Traction. Lg. & Pr. 5% 1st. Mt. 50 yr. G. Bds. ...	—	67	66	68
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	73/1½	70/7½
4%	4%	Do. 4% Deb. ...	100	91	76½	76½
4½%	4½%	Do. 4½% Deb. ...	100	98½	76	75½
5%	5%	Do. 5% Deb. ...	100	96	77⅞	77
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1 5/32	18/3	18/3
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	95½	95½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10 5/16	10 5/16
4½%	4½%	Do. 4½% Deb....	100	96	85	85
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97¾	97¾
$¼	$1	Brazilian Trac. & Power Ord....	$100	66	63¼	63¼
$1½	$1½	Do. 6% Cum. Pref.	$100	97	94	94¾
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅞	6¼
2/6	2/6	Do. 5% Cum. Pref.	5	5	89/-	89/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	39½	38½
6%	5%	Do. Pref. Ord....	100	106	40	40
5%	5%	Do. 5% Cum. Pref.	100	103	58½	58½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	63¾	63¾
—	—	Brit. Elec. Trac. Ord.	100	—	38½	—
—	— *	Do. 6% Cum. Part Pref. ...	100	—	80	—
5%	5%	Do. 5% Deb.	100	92	80	79¾
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70¾	70½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6¼	6¼
1/3	1/3	City of B.A. Trams.	5	5½	92/6	93/4½
5%	5%	Co. Ferro Carril do Jardin Botanico 5% 40 yr. 1st Mort. ...	100	93½	89	89
5/-	5/-	Dublin United Trys 6% Pref.	10	12	10¾	10¾
5%	5%	Hong Kong Trys. Co. 5% Mt. Dbs.	100	87½	79½	80¾
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2¾	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½xd	74½xd
—	—	La Plata Trams. Ord.	1	¾	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9 23/32	9 23/32
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/16	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	9/16	8/9	8/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	58	57
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	90½
5%	5%	Do. 5% Inc. Deb.	100	88½	79¾	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48¼	48½
5%	5%	Lynn & Boston 5% Gd. Bds. ...	$1,000	—	104½	103½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67¼	67¼
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	71½xd	70¾xd
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½	80½
$1½	$1½	Mexico Trams. Common ...	$100	70	27¼	27¼
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40¾	40¾
6%	6%	Do. 6% Mt. Bds.	100	76	34¼	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92½	92½
1/2*	1/2*	National Steam Car	1	15/32	16/-	15/3
9⅜d.*	9⅜d.*	New General Traction	1	¾	7/9xd	7/9xd
6d.	8⅜d.	Northern Gen. Trans. Ord. ...	1	25/32	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4¼	61/3	61/3
5%	5%	Do. 5% 1st Deb.	100	89½	70½	70½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr. Skg. fund Gd. B.	—	96	83½	83½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	19/32	10/6	10/6
8d.	10d.	Provincial Trams. Ord.	1	⅝	16/-	17/3
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	93¾	93
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82½	81¾
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88	87¾
5%	5%	Do. 5% Perp. Deb.	100	99½	78½	78½
—	—	Singapore Elec. Trams	5/-	¼	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% 1st. M.D....	—	100½	94¼	94¼
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76	74⅝
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4¾	85/-	85/-

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Aggregate. Increase or Dec.
Anglo-Argentine	June 17	£50,758	£49,888	25	£1,230,753	— £4,484
Auckland (28 days)	May 5	20,447	21,202	44	231,906	+ 4,308
Ballarat and Bendigo ...	Apr. 23	3,920	3,727	4	3,727	— 193
Brazilian Traction Mlrs.	Apr.	6,333,460	6,678,000	18	25,898,000	+1,475,940
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia $	Apr.	540,861	549,046	43	5,531,193	— 764,709
Buenos Aires Lacroze ...	May 11	44,480	41,503	48	454,605	— 11,116
Burmah Tramway ... Rs.	June 17	4,156	4,125	46	...	+ 6,419
Calcutta Rs.	,, 17	62,820	63,851	25	1,608,151	+ 85,159
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	May	1,931	2,927	22	12,857	+ 4,268
Cordoba	Mar.	12,746	13,598	52	161,906	+ 6,251
East India	May	2,119	2,161	43	20,867	+ 1,508
Hong Kong $	May 20	10,312	14,937	23	269,764	+ 58,040
Kalgoorlie	March	2,638	2,479	13	6,963	— 399
La Plata	May	4,489	4,343	22	22,189	+ 301
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon Escu.	Apr.	...	190,051	18	712,651	...
Madras (2 weeks)	June 15	27,340	30,277	23	341,092	+ 27,437
Manila $	Apr.	117,450	124,350	...	505,381	+ 16,765
Manaos Rs.	March	...	157,156	...	...	...
Melbourne	Apr.	...	69,542	...	...	...
Montevideo	May	27,771	28,349	30	215,768	+ 13,342
Peruvian $	May	737,166	826,900	48	8,833,997	+1,233,666
Port Elizabeth	Mar.	...	3,857	...	...	...
Rangoon	May	4,887	4,589	22	24,376	— 372
Shanghai $	May 10	24,552	29,263	...	...	...
Singapore $	May 6	12,014	13,175	18	221,047	+ 25,846
Toronto $	Apr.	795,816	883,209	18	3,546,784	+ 319,541
Winnipeg $	Apr.	264,856	282,498	18	1,169,808	— 63,597

* Issue of Traffic Returns temporarily suspended.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	June 13	£348	£447	+ 99	11	£4,038	+ £187
Aberdeen Corporation...	,, 14	1,866	1,785	— 81	2	3,840	— 283
Accrington Corp.	May 24	728	613	— 115	8	4,566	+ 45
Ayr Corporation	June 17	440	435	— 5	5	1,789	— 9
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 18	1,401	1,585	+ 184	11½	16,729	+ 1,122
Birmingham Corp.	,, 17	13,160	16,984	+ 3,824	11	182,370	+ 32,283
Do. Motor Omnibuses	,, 17	916	1,050	+ 134	11	10,323	+ 978
Blackburn Corp.	,, 14	1,370	1,567	+ 197	11½	14,911	— 462
Blackpool & Fleetwood.	,, 17	648	1,543	+ 895	24	11,505	+ 580
Blackpool Corp.	,, 15	1,202	2,555	+ 1,353	11	15,166	+ 1,269
Bolton Corporation	,, 11	2,832	2,795	— 37	11	29,677	+ 1,859
Bournemouth Corp.	,, 21	2,009	2,267	+ 258	12	26,064	+ 433
Bradford Corporation ...	,, 17	6,524	7,729	+ 1,205	11	76,125	— 684
Brighton Corporation ...	,, 18	1,130	1,259	+ 129	11⅔	12,824	+ 679
Bristol	,, 16	9,904	11,071	+ 1,167	24	228,391	+ 8,116
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 17	1,528	2,057	+ 529	12	20,797	— 919
Burton-on-Trent Corp...	,, 18	282	269	— 13	11	2,915	— 386
Bury Corporation	,, 16	1,390	1,815	+ 425	11⅔	16,598	+ 352
Cardiff Corporation	,, 3	2,644	2,852	+ 208	9	26,359	+ 1,090
Chatham & District	,, 15	1,243	1,235	— 8	24	26,879	+ 1,037
Chesterfield Corp.	,, 8	262	257	— 5	10	2,752	+ 76
Colne Corporation	,, 19	262	243	— 19	...	...	...
Cork Electric	,, 15	571	544	— 27	24	11,265	— 250
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	June 20	1,031	1,174	+ 143	11½	12,564	+ 476
Dover Corporation	,, 17	301	318	+ 17	11	3,421	— 3
Dublin & Lucan	,, 16	190	179	— 11	24	3,018	— 383
Dublin United	,, 16	6,643	6,558	— 85	24	131,508	— 9,878
Dundee City	,, 14	1,398	1,369	— 29	4⅔	5,962	+ 162
East Ham Corporation	,, 17	1,369	1,341	— 28	11	14,599	— 206
Exeter Corporation	,, 16	394	407	+ 13	11	4,141	— 149
Glasgow Corporation	,, 17	22,930	24,672	+ 1,742	2⅔	59,740	+ 4,551
Glasgow Subway	,, 17	1,008	1,061	+ 53	24	28,989	+ 3,051
Glossop (U. Elec. Supp.)	,, 17	131	158	+ 27	25	3,335	+ 400
Halifax Corporation	,, 13	2,262	2,600	+ 338	10½	24,026	— 564
Do. Motor Omnibuses	,, 13	46	54	+ 8	10½	492	— 65
Hastings & District	,, 16	1,010	1,029	+ 19	24	20,277	+ 273
Huddersfield Corp.	,, 17	2,673	3,718	+ 1,045	11	32,916	+ 2,770
Hull Corporation	,, 17	2,960	3,158	+ 197	11	34,378	— 1,016
Ilford U.D.C.	,, 17	673	692	+ 18	10	7,704	+ 410
Ilkeston Corporation ...	,, 21	128	134	— 4	12	1,603	+ 62
Ipswich Corporation	,, 17	571	599	+ 28	11	5,765	+ 219
Isle of Thanet	,, 17	408	355	— 53	37	10,104	— 1,889
Kilmarnock Corp.	,, 17	173	170	— 3	4⅔	776	— 61
Lanarkshire	,, 15	2,105	2,357	+ 252	24	52,395	+ 8,342
Lancashire United	,, 14	1,892	1,892	nil	24	40,375	+ 1,312
Leeds City	,, 17	9,188	10,481	+ 1,293	12	108,582	+ 8,308
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 17	791	862	+ 71	4⅔	4,052	+ 282
Leyton U.D.C.	,, 15	1,635	1,618	— 17	11	17,841	— 99
Liverpool Corporation...	,, 10	13,929	13,645	— 284	23½	312,527	+ 13,374
Llandudno & Colwyn B.	,, 16	390	571	+ 181	28½	6,990	— 367
London County Council	May 24	12,610	49,920	+37,310	7½	365,415	+ 46,678
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	June 10	188	132	— 56	35½	4,642	— 1,379
Maidstone Corporation..	,, 15	203	194	— 9	11	2,365	— 74
Manchester Corp.	,, 17	18,405	20,852	+ 2,447	11	209,174	+ 7,632
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	,, 17	185	252	+ 67	11¼	2,462	+ 282
N'castle-on-Tyne Corp.	,, 17	6,546	6,662	+ 116	11	70,522	+ 1,690
Newport (Mon.) Corp.	,, 17	852	992	+ 140	11	10,207	+ 619
New St. Helens & Dist.	,, 14	1,129	1,139	+ 10	50	49,769	+ 2,690
Northampton Corp.	,, 16	774	755	— 19	11	7,666	— 893
Nottingham Corp.	,, 15	3,718	3,924	+ 206	11	41,537	+ 966
Oldham Corporation ...	,, 18	2,402	2,908	+ 506	12	30,689	+ 1,541
Portsmouth Corp.	,, 17	2,679	2,757	+ 78	12	29,906	...
Preston Corporation	,, 14	939	1,340	+ 401	10⅔	11,734	+ 1,258
Provincial	,, 17	2,438	2,507	+ 69	37	79,344	+ 4,080
Reading Corporation	,, 15	817	827	+ 10	10⅔	8,797	+ 343
Rhondda Tramways	,, 8	1,160	1,192	+ 32	23	27,475	+ 1,132
Rochdale Corporation...	,, 17	1,772	2,202	+ 430	11½	20,532	+ 314
Rotherham Corp.	,, 21	1,139	1,539	+ 400	11⅔	16,702	+ 3,565
Salford Corporation	,, 19	5,402	6,416	+ 1,014	11⅔	62,929	+ 2,667
Sheffield Corporation.	,, 18	8,767	10,981	+ 2,214	12½	124,121	+ 20,188
Southampton Corp.	,, 14	1,526	1,629	+ 103	10⅔	16,733	+ 815
Southend-on-Sea Corp...	,, 14	737	873	+ 135	11	8,472	— 590
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 17	888	809	— 79	11½	8,843	+ 180
Sunderland Corp.	,, 7	1,501	1,607	+ 106	11	17,512	+ 584
Sunderland District...	,, 14	578	650	+ 72	33	19,049	+ 1,006
Swindon Corporation ...	,, 14	214	207	— 7	10⅔	2,130	+ 9
Torquay Tramways	,, 15	554	655	+ 101	24	11,638	— 17
Tyneside Trys. & Tmrds.	,, 14	808	620	— 188	24	12,675	— 839
Wallasey Corporation ...	,, 17	1,347	1,512	+ 165	11½	14,714	+ 191
Walsall Corporation	,, 17	756	954	+ 198	25	19,321	+ 2,347
Walthamstow U.D.C.	,, 17	1,025	1,049	+ 24	11	11,809	+ 1,530
Warrington Corp.	,, 15	461	491	+ 30	11	5,252	+ 407
West Ham Corporation	,, 15	3,212	3,228	+ 16	10⅔	35,358	+ 1,440
Wigan Corporation	,, 15	1,546	1,790	+ 244	11	18,173	+ 1,072
Wolverhampton Corp.	,, 21	1,085	1,196	+ 111	12	14,280	+ 1,279
Yorkshire (W. Riding)...	,, 18	1,605	2,058	+ 453	25	42,031	+ 3,596

* Issue of Traffic Returns suspended during the War.

Telegrams: KRANKASES, ISLING-LONDON.
Telephones: CENTRAL 4879. CITY 3846.

ALUMINIUM CASTINGS
MADE AND REPAIRED.

COAN CASTS CLEAN CRANK CASES

FOR ALL TRADES. | LARGE AND SMALL. | PURE AND HARDENED.

Inquiries invited. Estimates given.
Contractor to ADMIRALTY and WAR OFFICE.

R. W. COAN, THE ALUMINIUM FOUNDRY,
219, Goswell Road, London, E.C.

Digitized by Google

TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school." —*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated." —*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time." —*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management." —*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.)

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

250 pages, 10 × 6½ × 1 in., with over 150 Illustrations.

Price 10s. 6d.

A WORK OF REFERENCE INVALUABLE TO ENGINEERS, TRAMWAY MANAGERS, DIRECTORS, COMMITTEE MEN AND STUDENTS.

TRAMWAY AND RAILWAY WORLD OFFICES,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Digitized by Google

THE TRAMWAY & RAILWAY WORLD.
(REGISTERED AS A NEWSPAPER.)
Established in 1892.
PRICE ONE SHILLING.

JANUARY 1, 1916.
Vol. XXXIX., No. 1.
Offices: AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.
Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone No. GERRARD 2943.

#21838

The Tramway and Railway WORLD ILLUSTRATED

A REVIEW OF PROGRESS IN Electric AND OTHER Traction.

Stanford University Library MAY 1919

STEWARTS AND LLOYDS, LTD.

Head Offices—41, OSWALD STREET, GLASGOW; BROAD STREET CHAMBERS, BIRMINGHAM.
London Office—WINCHESTER HOUSE, OLD BROAD STREET, E.C.

TRADE S MARK.

TRADE L&L MARK.

MAKERS OF
WROUGHT-IRON AND STEEL TUBES
By the LAPWELDED, BUTTWELDED, SOLID DRAWN, AND LOCK-BAR PROCESSES.

TUBULAR TRAMWAY POLES
WITH ALL THE NECESSARY FITTINGS.

TUBES AND FITTINGS FOR ELECTRIC WIRING. STEEL PLATES FOR BOILERS, BRIDGES, Etc. STEEL CASTINGS.

Digitized by Google

TOOL STEEL GEARS AND PINIONS

For a long period British Railways and Tramways bought T.S. GEARS on our STATEMENTS. They are now buying them as a result of experience, and many systems are adopting them exclusively. Our Guarantees in EVERY CASE have been largely exceeded.

SCHOLEY & CO. LIMITED
56, Victoria Street
WESTMINSTER, LONDON, S.W.

Steam is the PRIME MOVER of the World.

THE FODEN

is the PRIME MOVER of Public Service Vehicles, and is the most Economical System of Transport in existence.

USED BY MANY LEADING CORPORATIONS.

London County Council Tramways.
Woolwich Borough Council.
Bath Corporation.
Burton-on-Trent Corporation.
Oldham Corporation.
Lincoln Corporation.
Flintshire County Council.
Newton-in-Makerfield U.D.C.
Northumberland County Council.

Catalogue and Particulars from FODENS, LTD., SANDBACH, CHESHIRE.

ROLLING STOCK SPECIALITIES.

OUR RATTAN

— (NATURAL, GLAZE, DULL FINISH, OR COLOURED) —
in twill, straight, or fancy weaves, canvas backed or unbacked, is

BRITISH MADE THROUGHOUT

from the splitting of the cane to the finished article.

We hold **LARGE STOCKS OF RAW MATERIALS** and can GUARANTEE PROMPT DELIVERIES.

Particulars of other **BRITISH SPECIALITIES** *upon application.*

THE GENERAL SEATING COMPANY LTD.
13, CITY ROAD, LONDON, E.C.

Digitized by Google

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

NAME OF COMPANY OR FIRM.	ADDRESS.	TELEGRAPHIC ADDRESS.	TELEPHONE NO.
Ailsa Oilskin & Rubber Co.	Ailsa Works, Dalry, Ayrshire	Ailsa, Dalry, Ayrshire	—
Allen & Co., Ltd., Edgar	Imperial Steel Works, Tinsley, Sheffield	Allen, Sheffield	Sheffield, 917, 265.
Allen & Co., Ltd., Edgar (Tramway Dept.)	Imperial Steel Works, Tinsley, Sheffield	Askham, Sheffield (Tramway and Machinery)	Sheffield, 213.
Anger Manufacturing and Supply Co., Ltd.	Bank Chambers, Preston, Lancs.	Brakjuster, Preston	Preston, 1033.
Armstrong, Stevens & Son, Ltd.	Whittall Street, Birmingham	Armstrongs, Birmingham	Birmingham, 6148.
Auto-Ticket Printing Co., Ltd.	41, Wapping, Liverpool	Extension, Liverpool	Bank, Liverpool, 4646.
Avon India Rubber Co., Ltd.	Melksham, Wilts	Rubber, Melksham	Melksham, 2.
Babcock & Wilcox, Ltd.	30, Farringdon Street, London, E.C.	Babcock, London	City 6470, (8 lines).
Baker & Co. (Rotherham), Ltd., J.	Brinsworth Iron and Wheel Works, Rotherham	Brinsworth, Rotherham	Rotherham, 89 and 435.
Belliss & Morcom, Ltd.	Ledsam Street Works, Birmingham	Belliss, Birmingham	Birmingham, 3044.
Bell Punch & Printing Co., Ltd.	52-58, Tabernacle Street, London, E.C.	Osmic, Finsquare, London	Central, 7531.
Blackwell & Co., Ltd., R. W.	14, Great Smith Street, London, S.W.	Kurkee, London	Victoria, 4765.
Bridgeport Brass Co.	Broadway and Murray Street, New York, U.S.A.	—	—
Brill Co., J. G.	110, Cannon Street, London, E.C.	Axles, London	Bank, 6018.
British Ackley Brake and Supply Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Acklebrusa, Estrand, London	Gerrard, 3272.
British Aluminium Co., Ltd.	109, Queen Victoria Street, London, E.C.	Cryolite, London	City 2676 (3 lines).
British Insulated & Helsby Cables, Ltd.	Prescot, Lancs.	Insulator, Prescot	Prescot, 8.
British Thomson-Houston Co., Ltd.	Rugby	Asteroidal, Rugby	Rugby 54 (5 lines).
British Westinghouse Electric & Mfg. Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Multiphase, Estrand, London	Gerrard, 3261 and 2476
Brockhouse & Co., Ltd.	Victoria Works, Hill Top, West Bromwich	Brockhouse, West Bromwich	West Bromwich, 228.
Burford & Co., Ltd., H. G.	11, Waterloo Place, London, S.W.	—	Regent, 5281.
Carbic, Limited	51, Holborn Viaduct, London, E.C.	Carbicitis, Cent., London	Holborn, 511
"Cedes" Electric Traction, Ltd.	112, Great Portland Street, London, W.	Cedesmixte, Wesdo, London	Mayfair, 6130.
Clay & Atkinson	Bower Street, Bradford	—	Bradford, 1263.
Clayton & Co. (Huddersfield), Ltd.	Union Works, Huddersfield	Karriakar, Huddersfield	Huddersfield, 1441, 2, 3.
Clough, Smith & Co., Ltd.	Regent House, Kingsway, London, W.C.	Clufmit, Westcent, London	Gerrard, 3288.
Coan, R. W.	219, Goswell Road, London, E.C.	Krankases, Isling-London	Central, 4879; City, 3846.
Commercial Cars, Ltd.	Biscot Road, Luton	Komerkars, Luton	Luton, 192 and 193.
Consolidated Accessories Co.	181, Queen Victoria Street, London, E.C.	Inbrake, Cent, London	Central, 5735.
Courtenay, J. W., Ltd.	Amberley House, Norfolk Street, W.C.	Tramigro, London	City, 7630.
Coventry Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	Coventry, 830.
Daimler Co., Ltd.	Daimler Works, Coventry	Daimler, Coventry	Coventry, 505.
Dennis Bros. (1913), Ltd.	Onslow Works, Guildford	Dennis, Guildford	Guildford, 129 and 329.
Dick, Kerr & Co., Ltd.	Abchurch Yard, Cannon Street, E.C.	Dicker, Cannon, London	Bank 5866 (4 lines).
Docker Brothers, Ltd.	170, Bishopsgate, London, E.C.	Matured, London	London Wall, 775.

(*Continued on page iv.*)

Some Countries and Colonies represented in

THE PAID SUBSCRIPTION LIST

OF THE

TRAMWAY & RAILWAY WORLD

South Australia	China	Portugal	New Zealand
Bombay Presidency	Burma	Mexico	Peru
Argentine	Holland	Cuba	Russia
Cape Colony	Denmark	Mandalay	Malta
Norway	Belgium	Hong Kong	Greece
Sweden	United States	New South Wales	Brazil
Hawaii	Chili	Straits Settlements	France
Jamaica	Sierra Leone	Victoria	Japan
Italy	Natal	Queensland	Egypt
Rhodesia	Switzerland	Tasmania	Soudan
Canada	Transvaal	Bengal	Etc., etc., etc.

Thanks to the British Navy, communications continue to be unaffected, and **THE TRAMWAY AND RAILWAY WORLD** (Illustrated), in war as in peace, has an International circulation of the greatest value to those who desire to ensure the retention of their present trade connections abroad and their extension now and after the war.

In our Illustrated issues all advertisements are printed on glazed paper; and, as the "British Printer" has well said, "all announcements receive appropriate setting with clear and forcible effects."

Digitized by Google

(*Continued from page iii.*)

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

Name of Company or Firm.	Address.	Telegraphic Address.	Telephone No.
Dunlop Rubber Co., Ltd.	Manor Mills, Aston, Birmingham	Elastic, Birmingham	Birmingham, East, 123.
Edison Accumulators, Ltd.	2 and 3, Duke Street, London, S.W.	Edibatt, St. James, London	Regent 5470 (6 lines).
Edison & Swan United Electric Light Co., Ltd.	Ponders End, Middlesex	Ediswan, Ponders End	Enfield, 520.
Electric Construction Co., Ltd.	Dashwood House, 9, New Broad Street, E.C.	Concordance, London	London Wall, 2671; and Central
Equipment & Engineering Co.	Westinghouse Building, Norfolk Street, London, W.C.	Kharparts, Estrand, London	City 1088 (2 lines). [10924
Ferranti, Ltd.	Central House, Kingsway, London, W.C.	Ferranti, Westcent, London	Regent, 1602.
Fodens, Ltd	Sandbach, Cheshire	Foden, Sandbach	Sandbach, 7.
Garrould, E. & R.	150-162, Edgware Road, London, W.	Garrould, London	Paddington, 5320
General Electric Co., Ltd.	71, Queen Victoria Street, London, E.C.	Polyphase, London	London Wall, 3600.
General Seating Co., Ltd.	13, City Road, London, E.C.	Cushioning, Finsquare, London	London Wall, 6187.
Glasgow Numerical Printing Co.	31, Finnieston Street, Glasgow	Tickets, Glasgow	Glasgow, 5350.
Glenn, J. Barber	Moorgate Station Chambers, London, E.C.	Octet, Ave., London	London Wall, 262.
Green & Sons, Ltd., E.	2, Exchange Street, Manchester	Economiser, Manchester	Manchester, 1375.
Green & Co. (Feltham), Ltd., Geo. W.	Q-Fel Works, Feltham	Cufel, Feltham	——
Grover & Co., Ltd.	Carpenters' Road, Stratford, E.	Adopted, Strat., London	Stratford, 984 and 985.
Hadfields, Ltd.	Hecla Works, Sheffield	Hadfield, Sheffield	Sheffield, 750, 2628, and 2638.
Hailey's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	Clydebank, 196 and 197.
Hazel & Co.	16, Nile Street, City Road, London, E.C.	——	——
Henley's Telegraph Works, Ltd.	13 and 14, Blomfield Street, London Wall, E.C.	Henletel, Ave., London	London Wall, 4560.
Henley's Telegraph Works, Ltd. (Tire Dept.)	18, Union Street, Moorfields, E.C.	Hetewocol, Ave., London	London Wall, 3886.
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	Motherwell, 44.
International Time Recording Co.	57, City Road, London, E.C.	Countable, Finsquare, London	London Wall, 6374.
Kearsley & Co., Ltd., Robt.	Ripon, Yorks	Kearsley, Ripon	Ripon, 5.
Leyland Motors, Ltd	Leyland, Lancs.	Motors, Leyland	Leyland, 37.
Lorain Steel Co.	36-38, New Broad Street, London, E.C.	Thoughtful, London	London Wall, 8186.
Macintosh & Co., Ltd., Chas.	Cambridge Street, Manchester	Macintosh, Manchester	Manchester, Central, 7147.
M. & G. Truck and Engineering Co., Ltd.	St. John's House, 124-127, Minories, London, E.	Emgestock, Ald., London	Avenue, 729.
Magnolia Anti-Friction Metal Co., Ltd.	49, Queen Victoria Street, London, E.C.	Magnolier, Cannon, London	City 6596.
Maudslay Motor Co., Ltd.	Parkside, Coventry	Maudslay, Coventry	Coventry, 110.
Micanite & Insulators Co., Ltd.	Empire Works, Blackhorse Lane, Walthamstow, E.	Mytilite, Phone, London	Walthamstow, 38.
Millars' Timber and Trading Co., Ltd.	Pinners' Hall, London, E.C.	Jarrah, Stock, London	London Wall, 368.
Mirrlees, Watson Co., Ltd.	Scotland Street, Glasgow	Mirrlees, Glasgow	South Side, 1781.
Motor Rail and Tram Car Co., Ltd.	79, Lombard Street, London, E.C.	——	Avenue, 1777.
Motor Traction	20, Tudor Street, London, E.C.	Autocars, Fleet, London	City, 2848.
Municipal Tramways Association	C. J. Spencer, 7, Hall Ings, Bradford	Tramways, Bradford	Bradford 2381 and 2382.
Napier & Son, Ltd., D.	14, New Burlington Street, London, W.	Nitrifier, Reg., London	Gerrard, 8926.
National Electric Construction Co., Ltd.	3, Laurence Pountney Hill, London, E.C.	Overhauled, London	Bank, 5329.
Nobles and Hoare	Cornwall Road, Stamford Street, London, S.E.	Nobles, Watloo, London	Hop, 1302.
Oriental Tube Co., Ltd.	West Bromwich	Tubes, West Bromwich	West Bromwich, 45.
Patent File and Tool Co., Ltd.	8, White Street, Moorfields, E.C.	Ironheads, London	London Wall, 2683 and 2968.
Peacock Brake Co.	181, Queen Victoria Street, London, E.C.	Inbrake, Cent London	Central 5735.
Pease & Partners, Ltd.	Tees Ironworks, Middlesbrough	Pease, Middlesbrough	Middlesbrough, 917.
Peckham Truck and Engineering Co., Ltd.	32, Broadway, Westminster, London, S.W.	Truxenpeck, London	Victoria, 2494.
Pinchin, Johnson & Co., Ltd.	Minerva House, 26 and 27, Bevis Marks, London, E.C.	Pinchin, Ald., London	London Wall, 9916.
R.E.T. Construction Co., Ltd.	Finsbury Pavement House, London, E.C.	Raillessly, Ave., London	London Wall, 1384.
Railway & General Engineering Co., Ltd.	Meadow Works, Nottingham	Dot, Nottingham	Nottingham, 19.
Ruberoid Co., Ltd.	81-83, Knightrider Street, London, E.C.	Ruberoid, Cent., London	Central, 1480.
Russell & Sons, Ltd., James	Crown Tube Works, Wednesbury	Russell, Wednesbury	Wednesbury, 2.
Scholey & Co., Ltd.	56, Victoria Street, London, S.W.	Scolanco, Sowest, London	Victoria 6663 (2 lines).
Shepherds' Parging Block Co.	Milkstone, Rochdale	Shepherd, Milkstone, Rochdale	Rochdale, 29x.
Shrewsbury & Challiner Tyre Co., Ltd.	Kay Street, Ardwick Green, Manchester	Challiner, Manchester	Manchester, Central, 962.
Siemens Brothers Dynamo Works, Ltd.	38 & 39, Upper Thames Street, London, E.C.	Siemotor, Cent, London	City 5350 (9 lines).
Simplex Conduits, Ltd.	Garrison Lane, Birmingham	Economy, Birmingham	Birmingham, Victoria, 535.
Simplex Rubber Co., Ltd.	Scrubbs Lane, Willesden, London, N.W.	Simplexine, Kensal, London	Willesden, 550.
Skefko Ball Bearing Co., Ltd	Skefko Works, Luton	Skefko, Luton	Luton, 418.
Smethwick Stamping Co.	Bridge Street, Smethwick	——	——
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester	Manchester, 2334.
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.	——	Avenue, 5463.
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	Glasgow, City, 9880.
Straker-Squire, Ltd.	Nelson Square, Blackfriars, London, S.E.	Rhomboidal, London	Hop, 369 and 370.
Taylor, John	7, Strand Street, Liverpool	Velo, Liverpool	Liverpool (Bank), 4484.
"The Coventry" Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	Coventry, 830.
Thermit, Ltd.	27, Martin's Lane, Cannon Street, London, E.C.	Fulmen, Cannon, London	City, 4292.
Tilling-Stevens, Ltd.	Victoria Works, Maidstone	Petelobus, Maidstone	Maidstone, 117.
Titan Trackwork Co., Ltd.	Rutland Road, Sheffield	Crossings, Sheffield	Sheffield, Central, 798.
Tramways and Light Railways Association	Caxton House, Westminster, London, S.W.	Tralitrayl, Vic., London	Victoria, 2110.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.	Tramigro, London	Gerrard, 2948.
Tramway Supplies, Ltd.	160, Woodhouse Lane, Leeds	Controller, Leeds	Leeds, Central, 3488.
Tudor Accumulator Co., Ltd.	3, Central Buildings, London, S.W.	Subconical, London	Victoria, 2600.
Tyne Metal Co., Ltd.	Skinnerburn Road, Newcastle-on-Tyne	Floating, Newcastle-on-Tyne	Newcastle, 2943.
Underground Electric Railways Co.	Electric Railway House, London, S.W.	Underneath, Vic., London	Victoria, 5820.
United Electric Car Co., Ltd.	Preston, Lancs.	Prescar, Preston	Preston, 219 and 220.
Val de Travers Asphalte Paving Co., Ltd.	Hamilton House, Bishopsgate, London, E.C.	Traversable, Ave., London	London Wall, 7467.
Valor Co., Ltd.	Rocky Lane, Aston Cross, Birmingham	Valor, Birmingham	Birmingham, East, 252 and 253.
Walter Scott, Ltd.	Leeds Steel Works, Leeds	Bessemer, Leeds	Leeds, 510.
Watlington & Co., Ltd.	Britannia House, 48, Milton Street, London, E.C.	Aetnaco, Barb., London	City, 1257 (2 lines).
Waygood-Otis, Ltd.	Falmouth Road, London, S.E.	Waygood, Sedist, London	Hop, 4000.
Wells, A. C. & Co.	102-104, Midland Road, St. Pancras, London, N.W.	Unbreakable, Kincross, London	North, 341.
Westinghouse Brake Co., Ltd.	York Road, King's Cross, London, N.	Westinghouse, Kincross, London	North, 2416. [9886
White & Co. J. G.	9, Cloak Lane, Cannon Street, London, E.C.	Whitterick, Cannon, London	London Wall, 3306, and Central
Williamson, Alfred	North Mill Printing Works, Ashton-under-Lyne.	——	Ashton-under Lyne, 320.
Wood-Milne, Ltd.	Ribble Bank Mills, Preston, Lancs.	Comfort, Preston	Preston, 413.
Yarwood & Co., Ltd., John	Bramber Rd., North End Rd., Fulham, London, S.W.	Bernotor, Weskkens, London	Kensington, 4211.
Youngs	Ryland Street Works, Birmingham	Oldens, Birmingham	Midland, 301

Printed for the Proprietors by The Botolph Printing Works, London, and Published at Amberley House, Norfolk Street, London, W.C.—Jan. 1, 1916

The Offices of THE TRAMWAY AND RAILWAY WORLD are at Amberley House, Norfolk Street, London, W.C.

Digitized by Google

THE TRAMWAY & RAILWAY WORLD.
(REGISTERED AS A NEWSPAPER.)
Established in 1892.
PRICE ONE SHILLING.

JUNE 24, 1916.
Vol. XXXIX., No. 32.
Offices: AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.
Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone No. GERRARD 2948.

The Tramway and Railway WORLD ILLUSTRATED

A REVIEW OF PROGRESS IN Electric AND OTHER Traction.

Stanford Library
JUL 18 1916

STEWARTS AND LLOYDS, LTD.

Head Offices—41, OSWALD STREET, GLASGOW; BROAD STREET CHAMBERS, BIRMINGHAM.
London Office—WINCHESTER HOUSE, OLD BROAD STREET, E.C.

TRADE S MARK.

TRADE L&L MARK.

MAKERS OF
WROUGHT-IRON AND STEEL TUBES
By the LAPWELDED, BUTTWELDED, SOLID DRAWN, AND LOCK-BAR PROCESSES.

TUBULAR TRAMWAY POLES
WITH ALL THE NECESSARY FITTINGS.

TUBES AND FITTINGS FOR ELECTRIC WIRING. STEEL PLATES FOR BOILERS, BRIDGES, Etc. STEEL CASTINGS.

Digitized by Google

TOOL STEEL GEARS AND PINIONS

For a long period British Railways and Tramways bought T.S. GEARS on our STATEMENTS. They are now buying them as a result of experience, and many systems are adopting them exclusively. Our Guarantees in EVERY CASE have been largely exceeded.

SCHOLEY & CO. LIMITED
56, Victoria Street
WESTMINSTER, LONDON, S.W.

Steam is the PRIME MOVER of the World.

THE FODEN

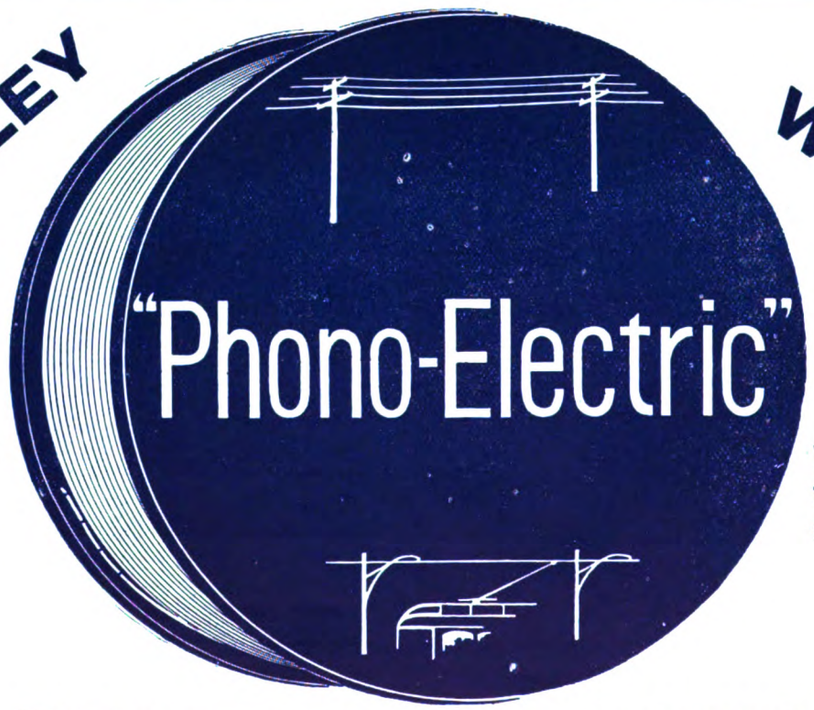
is the PRIME MOVER of Public Service Vehicles, and is the most Economical System of Transport in existence.

USED BY MANY LEADING CORPORATIONS.

London County Council Tramways.
Woolwich Borough Council.
Bath Corporation.
Burton-on-Trent Corporation.
Oldham Corporation.
Lincoln Corporation.
Flintshire County Council.
Newton-in-Makerfield U.D.C.
Northumberland County Council.

Catalogue and Particulars from FODENS, LTD., SANDBACH, CHESHIRE.

TROLLEY WIRE



Manufactured by the Bridgeport Brass Co.

Wears 2 to 3 times as long as hard-drawn Copper.

THE EQUIPMENT & ENGINEERING CO.
2 & 3, Norfolk Street, STRAND, LONDON, W.C.

Telephone— CITY 1088 (2 lines).
Telegrams— Kharparts, Estrand, London.

Digitized by Google

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

NAME OF COMPANY OR FIRM.	ADDRESS.	TELEGRAPHIC ADDRESS.	TELEPHONE NO.
Ailsa Oilskin & Rubber Co.	Ailsa Works, Dalry, Ayrshire	Ailsa, Dalry, Ayrshire	—
Allen & Co., Ltd., Edgar	Imperial Steel Works, Tinsley, Sheffield	Allen, Sheffield	Sheffield, 917, 265.
Allen & Co., Ltd., Edgar (Tramway Dept.)	Imperial Steel Works, Tinsley, Sheffield	Askham, Sheffield (Tramway and Machinery)	Sheffield, 213.
Anger Manufacturing and Supply Co., Ltd.	Bank Chambers, Preston, Lancs.	Brakjuster, Preston	Preston, 1033.
Armstrong, Stevens & Son, Ltd.	Whittall Street, Birmingham	Armstrongs, Birmingham	Birmingham, 6148.
Auto-Ticket Printing Co., Ltd.	41, Wapping, Liverpool	Extension, Liverpool	Bank, Liverpool, 4646.
Avon India Rubber Co., Ltd.	Melksham, Wilts	Rubber, Melksham	Melksham, 2.
Babcock & Wilcox, Ltd.	30, Farringdon Street, London, E.C.	Babcock, London	City 6470, (8 lines).
Baker & Co. (Rotherham), Ltd., J.	Brinsworth Iron and Wheel Works, Rotherham	Brinsworth, Rotherham	Rotherham, 89 and 435.
Belliss & Morcom, Ltd.	Ledsam Street Works, Birmingham	Belliss, Birmingham	Birmingham, 3044.
Bell Punch & Printing Co., Ltd.	52-58, Tabernacle Street, London, E.C.	Osmic, Finsquare, London	Central, 7531.
Blackwell & Co., Ltd., R. W.	14, Great Smith Street, London, S.W.	Kurkee, London	Victoria, 4765.
Bridgeport Brass Co.	Broadway and Murray Street, New York, U.S.A.	—	—
Brill Co., J. G.	110, Cannon Street, London, E.C.	Axles, London	Bank, 6018.
British Ackley Brake and Supply Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Acklebrusa, Estrand, London	Gerrard, 3272.
British Aluminium Co., Ltd.	109, Queen Victoria Street, London, E.C.	Cryolite, London	City 2676 (3 lines).
British Insulated & Helsby Cables, Ltd.	Prescot, Lancs.	Insulator, Prescot	Prescot, 8.
British Thomson-Houston Co., Ltd.	Rugby	Asteroidal, Rugby	Rugby 54 (5 lines).
British Westinghouse Electric & Mfg. Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Multiphase, Estrand, London	Gerrard, 3261 and 2476.
Brockhouse & Co., Ltd.	Victoria Works, Hill Top, West Bromwich	Brockhouse, West Bromwich	West Bromwich, 228.
Burford & Co., Ltd., H. G.	11, Waterloo Place, London, S.W.	—	Regent, 5281.
Carbic, Limited	51, Holborn Viaduct, London, E.C.	Carbicitis, Cent., London	Holborn, 511
"Cedes" Electric Traction, Ltd.	112, Great Portland Street, London, W.	Cedesmixte, Wesdo, London	Mayfair, 6130.
Clay & Atkinson	Bower Street, Bradford	—	Bradford, 1263.
Clayton & Co. (Huddersfield), Ltd.	Karrier Works, Huddersfield	Karriakar, Huddersfield	Huddersfield, 1441, 2, 3.
Clough, Smith & Co., Ltd.	Regent House, Kingsway, London, W.C.	Clufmit, Westcent, London	Gerrard, 3288.
Coan, R. W.	219, Goswell Road, London, E.C.	Krankases, Isling-London	Central, 4879; City, 3846.
Commercial Cars, Ltd.	Biscot Road, Luton	Komerkars, Luton	Luton, 192 and 193.
Consolidated Accessories Co.	181, Queen Victoria Street, London, E.C.	Inbrake, Cent, London	Central, 5735.
Courtenay, J. W., Ltd.	Amberley House, Norfolk Street, W.C.	Tramigro, London	City, 7630.
Coventry Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	Coventry, 830.
Daimler Co., Ltd.	Daimler Works, Coventry	Daimler, Coventry	Coventry, 505.
Dennis Bros. (1913), Ltd.	Onslow Works, Guildford	Dennis, Guildford	Guildford, 129 and 329.
Dick, Kerr & Co., Ltd.	Abchurch Yard, Cannon Street, E.C.	Dicker, Cannon, London	Bank 5866 (4 lines).
Docker Brothers, Ltd.	170, Bishopsgate, London, E.C.	Matured, London	London Wall, 775.

(*Continued on page iv.*)

Some Countries and Colonies represented in THE PAID SUBSCRIPTION LIST OF THE

TRAMWAY & RAILWAY WORLD

South Australia	China	Portugal	New Zealand
Bombay Presidency	Burma	Mexico	Peru
Argentine	Holland	Cuba	Russia
Cape Colony	Denmark	Mandalay	Malta
Norway	Belgium	Hong Kong	Greece
Sweden	United States	New South Wales	Brazil
Hawaii	Chili	Straits Settlements	France
Jamaica	Sierra Leone	Victoria	Japan
Italy	Natal	Queensland	Egypt
Rhodesia	Switzerland	Tasmania	Soudan
Canada	Transvaal	Bengal	Etc., etc., etc.

Thanks to the British Navy, communications continue to be unaffected, and **THE TRAMWAY AND RAILWAY WORLD** (Illustrated), in war as in peace, has an International circulation of the greatest value to those who desire to ensure the retention of their present trade connections abroad, and their extension now and after the war.

In our Illustrated issues all advertisements are printed on glazed paper; and, as the "British Printer" has well said, "all announcements receive appropriate setting with clear and forcible effects."

Digitized by Google

(*Continued from page iii.*)

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of THE TRAMWAY AND RAILWAY WORLD.

Name of Company or Firm.	Address.	Telegraphic Address.	Telephone No.
Dunlop Rubber Co., Ltd.	Manor Mills, Aston, Birmingham	Elastic, Birmingham	Birmingham, East, 123.
Edison Accumulators, Ltd.	2 and 3, Duke Street, London, S.W.	Edibatt, St. James, London	Regent 5470 (6 lines).
Edison & Swan United Electric Light Co., Ltd.	Ponders End, Middlesex	Ediswan, Ponders End	Enfield, 520.
Electric Construction Co., Ltd.	Dashwood House, 9, New Broad Street, E.C.	Concordance, London	London Wall, 2671; and Central
Equipment & Engineering Co.	Westinghouse Building, Norfolk Street, London, W.C.	Kharparts, Estrand, London	City 1088 (2 lines). [10924
Fodens, Ltd.	Sandbach, Cheshire	Foden, Sandbach	Sandbach, 7.
General Electric Co., Ltd.	67, Queen Victoria Street, London, E.C.	Polyphase, London	London Wall, 3600.
General Seating Co., Ltd.	13, City Road, London, E.C.	Cushioning, Finsquare, London	London Wall, 6187.
Glasgow Numerical Printing Co.	31, Finnieston Street, Glasgow	Tickets, Glasgow	Glasgow, 5350.
Glenn, J. Barber	Moorgate Station Chambers, London, E.C.	Octet, Ave., London	London Wall, 262.
Goodyear Tyre & Rubber Co., Ltd.	Central House, Kingsway, London, W.C.	Gotyruco, London	Regent, 3324.
Green & Sons, Ltd., E.	2, Exchange Street, Manchester	Economiser, Manchester	Manchester, 1375.
Green & Co. (Feltham), Ltd., Geo. W.	Q-Fel Works, Feltham	Cufel, Feltham	—
Grover & Co., Ltd.	Carpenters' Road, Stratford, E.	Adopted, Strat., London	Stratford, 984 and 985.
Hadfields, Ltd.	Hecla Works, Sheffield	Hadfield, Sheffield	Sheffield, 750, 2628, and 2639
Hailey's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	Clydebank, 196 and 197.
Henley's Telegraph Works, Ltd.	13 and 14, Blomfield Street, London Wall, E.C.	Henletel, Ave., London	London Wall, 4560.
Henley's Telegraph Works, Ltd. (Tire Dept.)	18, Union Street, Moorfields, E.C.	Hetewocol, Ave., London	London Wall, 3886.
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	Motherwell, 44.
International Time Recording Co.	57, City Road, London, E.C.	Countable, Finsquare, London	London Wall, 6374.
Johnson & Phillips, Ltd.	Charlton, London, S.E.	Juno, Charlton, London, S.E.	Greenwich, 400.
Kearsley & Co., Ltd., Robt.	Ripon, Yorks	Kearsley, Ripon	Ripon, 5.
Lacre Motor Car Co., Ltd.	78, York Road, King's Cross, London, N.	Unbaffled, London	North, 2708
Leyland Motors, Ltd.	Leyland, Lancs.	Leymotors, Leyland	Leyland, 37.
Lorain Steel Co.	36-38, New Broad Street, London, E.C.	Thoughtful, London	London Wall, 8186.
Macintosh & Co., Ltd., Chas.	Cambridge Street, Manchester	Macintosh, Manchester	Manchester, Central, 7147.
& G. Truck and Engineering Co., Ltd.	St. John's House, 124-127, Minories, London, E.	Emgestock, Ald., London	Avenue, 729.
Magnolia Anti-Friction Metal Co., Ltd.	49, Queen Victoria Street, London, E.C.	Magnolier, Cannon, London	City 6596.
Maudslay Motor Co., Ltd.	Parkside, Coventry	Maudslay, Coventry	Coventry, 110.
Millars' Timber and Trading Co., Ltd.	Pinners' Hall, London, E.C.	Jarrah, Stock, London	London Wall, 368.
Mirrlees, Watson Co., Ltd.	Scotland Street, Glasgow	Mirrlees, Glasgow	South Side, 1781.
Motor Rail and Tram Car Co., Ltd.	79, Lombard Street, London, E.C.	—	Avenue, 1777.
Motor Traction	20, Tudor Street, London, E.C.	Autocars, Fleet, London	City, 2848.
Municipal Tramways Association	C. J. Spencer, 7, Hall Ings, Bradford	Tramways, Bradford	Bradford 2381 and 2382.
Napier & Son, Ltd., D.	14, New Burlington Street, London, W.	Nitrifier, Reg., London	Gerrard, 8926.
National Electric Construction Co., Ltd.	8, Laurence Pountney Hill, London, E.C.	Overhauled, London	Bank, 5329.
Nobles and Hoare	Cornwall Road, Stamford Street, London, S.E.	Nobles, Watloo, London	Hop, 1302.
Oriental Tube Co., Ltd.	West Bromwich	Tubes, West Bromwich	West Bromwich, 45.
Patent File and Tool Co., Ltd.	8, White Street, Moorfields, E.C.	Ironheads, London	London Wall, 2683 and 2968.
Peacock Brake Co.	181, Queen Victoria Street, London, E.C.	Inbrake, Cent London	Central 5735.
Pease & Partners, Ltd.	Tees Ironworks, Middlesbrough	Pease, Middlesbrough	Middlesbrough, 917.
Peckham Truck and Engineering Co., Ltd.	26, Budge Row, Cannon Street, London, E.C.	Truxenpeck, London	City, 3294.
Pinchin, Johnson & Co., Ltd.	Minerva House, 26 and 27, Bevis Marks, London, E.C.	Pinchin, Ald., London	Avenue, 910.
R.E.T. Construction Co., Ltd.	Finsbury Pavement House, London, E.C.	Raillessly, Ave., London	London Wall, 1384.
Ruberoid Co., Ltd.	81-83, Knightrider Street, London, E.C.	Ruberoid, Cent., London	Central, 1480.
Russell & Sons, Ltd., James	Crown Tube Works, Wednesbury	Russell, Wednesbury	Wednesbury, 2.
Scholey & Co., Ltd.	56, Victoria Street, London, S.W.	Scolanco, Sowest, London	Victoria 6663 (2 lines).
Shepherds' Parging Block Co., Ltd.	Milkstone, Rochdale	Shepherd, Milkstone, Rochdale	Rochdale, 912.
Shrewsbury & Challiner Tyre Co., Ltd.	Kay Street, Ardwick Green, Manchester	Challiner, Manchester	Manchester, Central, 962.
Siemens Brothers Dynamo Works, Ltd.	38 & 39, Upper Thames Street, London, E.C.	Siemotor, Cent, London	City 5350 (9 lines).
Simplex Conduits, Ltd.	Garrison Lane, Birmingham	Economy, Birmingham	Birmingham, Victoria, 535.
Simplex Rubber Co., Ltd.	Scrubbs Lane, Willesden, London, N.W.	Simplexine, Kensal, London	Willesden, 550.
Skefko Ball Bearing Co., Ltd	Skefko Works, Luton	Skefko, Luton	Luton, 418.
Smethwick Stamping Co.	Bridge Street, Smethwick	—	—
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester	Manchester, 2334.
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.	—	Avenue, 5463.
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	Glasgow, City, 9880.
Straker-Squire, Ltd.	Nelson Square, Blackfriars, London, S.E.	Rhomboidal, London	Hop, 369 and 370.
Taylor, John	7, Strand Street, Liverpool	Velo, Liverpool	Liverpool (Bank), 4484.
"The Coventry" Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	Coventry, 830.
Thermit, Ltd.	675, Commercial Road, London, E.	Fulmen, Step, London	East, 4157.
Thornycroft & Co., Ltd.	Caxton House, Westminster, London, S.W.	Thornycroft, London	Victoria, 8000
Tilling-Stevens, Ltd.	Victoria Works, Maidstone	Tilling-Stevens, Maidstone	Maidstone, 117.
Titan Trackwork Co., Ltd.	Rutland Road, Sheffield	Crossings, Sheffield	Sheffield, Central, 798.
Tramways and Light Railways Association	Caxton House, Westminster, London, S.W.	Tralitrayl, Vic., London	Victoria, 2110.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.	Tramigro, London	Gerrard, 2948.
Tramway Supplies, Ltd.	160, Woodhouse Lane, Leeds	Controller, Leeds	Leeds, Central, 3488.
Tudor Accumulator Co., Ltd.	3, Central Buildings, London, S.W.	Subconical, London	Victoria, 2600.
Tyne Metal Co., Ltd.	Skinnerburn Road, Newcastle-on-Tyne	Floating, Newcastle-on-Tyne	Newcastle, 2943.
Underground Electric Railways Co.	Electric Railway House, London, S.W.	Underneath, Vic., London	Victoria, 6800.
United Electric Car Co., Ltd.	Preston, Lancs.	Prescar, Preston	Preston, 219 and 220.
Val de Travers Asphalte Paving Co., Ltd.	Hamilton House, Bishopsgate, London, E.C.	Traversable, Ave., London	London Wall, 7467.
Valor Co., Ltd.	Rocky Lane, Aston Cross, Birmingham	Valor, Birmingham	Birmingham, East, 252 and 253
Walter Scott, Ltd.	Leeds Steel Works, Leeds	Bessemer, Leeds	Leeds, 510.
Watlington & Co., Ltd.	Britannia House, 48, Milton Street, London, E.C.	Aetnaco, Barb., London	City, 1257 (2 lines).
Waygood-Otis, Ltd.	Falmouth Road, London, S.E.	Waygood, Sedist, London	Hop, 4000.
Wells, A. C. & Co.	102-104, Midland Road, St. Pancras, London, N.W.	Unbreakable, Kincross, London	North, 341. [9886
White & Co. J. G.	9, Cloak Lane, Cannon Street, London, E.C.	Whitterick, Cannon, London	London Wall, 3306, and Central
Williamson, Alfred	North Mill Printing Works, Ashton-under-Lyne.	—	Ashton-under Lyne, 320.
Wood-Milne, Ltd.	Ribble Bank Mills, Preston, Lancs.	Comfort, Preston	Preston, 413.
Yarwood & Co., Ltd., John	Bramber Rd., North End Rd., Fulham, London, S.W.	Bernotor, Weskkens, London	Kensington, 4211.
Youngs	Ryland Street Works, Birmingham	Oldens, Birmingham	Midland, 301
Zenith Carburetter Co., Ltd.	40-42, Newman Street, London, W.	Zenicarbur Ox, London	Regent 4812 and 4813.

Printed for the Proprietors by The Botolph Printing Works, London, and Published at Amberley House, Norfolk Street, London, W.C.—June 24, 1916.

The Offices of THE TRAMWAY AND RAILWAY WORLD are at Amberley House, Norfolk Street, London, W.C.

Digitized by Google

Digitized by Google

Digitized by Google

FOR
USE IN LIBRARY
ONLY
DO NOT REMOVE
FROM LIBRARY

Digitized by Google

Digitized by Google